THE LANCET

No. 7011 LONDON SATURDAY 11 JANUARY 1958 VOL. I FOR 1958

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

Regulation of Body Temperature in Health and Disease
Sir GEORGE PICKERING, F.R.C.P. 59

The Choice Between Death from Postmaturity and Death from Induction of Labour
G. F. GIBBERD, F.R.C.O.G. 64

The Check-valve Mechanism and the Meaning of Emphysema
W. A. LISTER, F.R.C.P. 66

Effects of Penicillamine and Dimercaprol on Turnover of Copper in Patients with Wilson's Disease
S. B. OSBORN, B.SC., J. M. WALSHE, M.R.C.P. 70

The Clinical Significance of Sternal Tenderness
N. D. GOWER, M.B. 73

Sex Reversal: Ovarian Tissue Associated with Male Nuclear Sex
D. J. B. ASHLEY, M.D., C. H. JONES, M.D. 74

Intrathecal Phenol for Intractable Pain
P. W. NATHAN, M.R.C.P., T. G. SCOTT, M.B. 76

Intraglossal Injections in Unconscious Patients
JOHN BULLOUGH, F.F.A. R.C.S. 80

Phæochromocytoma of the Urinary Bladder
B. R. B. LUMB, M.R.C.P., G. A. GRESHAM, M.D. 81

PRELIMINARY COMMUNICATION

A Theory of Nerve Deafness
R. L. GREGORY, M.A., JEAN WALLACE, B. COM. 83

NEW INVENTIONS

A Simple Resectoscope
J. P. MITCHELL, F.R.C.S. 84

An Obturator for Filling Burr-holes
J. R. GIBBS, F.R.C.S. 85

POINTS OF VIEW

A Plastic Approach to Surgery
CHARLES HEANLEY, F.R.C.S. ... 94

PUBLIC HEALTH

Influenza in Liverpool
Prof. A. B. SEMPLE, M.D., J. B. MEREDITH DAVIES, M.D., P. J. DISLEY, M.B. 95

The Public Health in 1956 97

Infectious Diseases in England and Wales 99

LEADING ARTICLES

Sex Reversal 89

Occupation and Compensation 90

ANNOTATIONS

Getting Over Operations 91

Kuru 92

Measurement of Blood-Pressure in Infancy 93

F.A.O. 93

New Year Honours 93

SPECIAL ARTICLES

New Year Honours 100

MEDICAL SOCIETIES

The Heberden Society 86

MEDICINE AND THE LAW

Is Automatism a Defence to Crime? 99

Medical Reports in Criminal Proceedings 100

LETTERS TO THE EDITOR

Surgery or Radium for Cancer? (Prof. H. C. McLaren, F.R.C.O.G. and others; Dr. Carl Wood) 102

Prognosis of Urinary Infections in Childhood (Dr. Victoria Smallpeice) 103

"Munchausen's Syndrome" (Mr. T. Raghavachar) 103

Forceps Delivery (Dr. R. J. Hamer Hodges, Dr. J. J. Foley, Dr. J. R. Bennett) 103

Tick-borne Meningoencephalomyelitis in Sweden (Dr. G. von Zeipel and others) 104

The New China (Prof. L. G. Kilborn, M.D.) 104

The Reinforcement of Tendon-reflexes (Dr. A. J. Buller, Dr. A. C. Dornhorst) 105

Trichomonas Vaginitis (Dr. H. C. Stewart) 105

Effect of *d*-Tubocurarine Chloride on Blood-pressure (Dr. E. T. Thomas) 105

Validity of Urea Method for Estimating Body-water (Dr. Oliver FitzGerald) 105

The Stripping of Varicose Veins (Mr. R. Rowden Foote, M.R.C.S.) 106

A Thyroid Association (Prof. Russell Fraser, F.R.C.P., Mr. Selwyn Taylor, F.R.C.S., Prof. E. J. Wayne, F.R.C.P.) 106

Intelligence of Drivers (Mr. A. G. J. Evans) 106

Aid for Volumetric Filling of Syringes (Dr. S. M. Lewis) 106

Enzyme Tests for Glucose (Dr. R. D. Miller) 106

Infantile Gastroenteritis (Dr. I. M. Librach) 107

Manipulation for Backache (Dr. James Cyriax; Dr. W. Hargrave-Wilson) 107

Effects of Protein Foods on Blood-sugar Levels (Mr. M. Srinivasan, D.SC.) 107

Osteitis Pubis after Inguinal Herniorrhaphy (Mr. Harold Dodd, F.R.C.S.; Mr. E. Kirz, F.R.C.S.) 108

Radiation: Further Warnings (Dr. J. F. Loutit) 108

Chest X-ray Examinations and Radiation Hazards (Dr. R. Grenville-Mathers) 108

OBITUARY

Sir Ernest Kennaway 109

Harold George Bedford Russell ... 110

Harold Percy Waller Barrow 111

William James Fenton 111

Edith May Hall 111

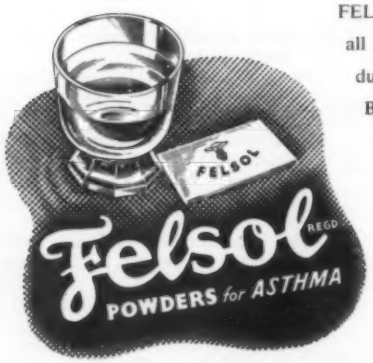
Thomas Herbert Cecil Benians ... 112

Joseph Lennox Pawan 112

DUPLICATE NATIONAL LIBRARY OF MEDICINE

Offices: 7, Adam Street, Adelphi, London, W.C.2. *Telephone*: Temple Bar 7228/9. *Telegrams*: Lancet, Rand, London. Founded 1823. Published weekly. Registered as a Newspaper. **Price 1s. 6d.** Annual Subscription: Three guineas.

ASTHMA AND THE BUSY PRACTITIONER



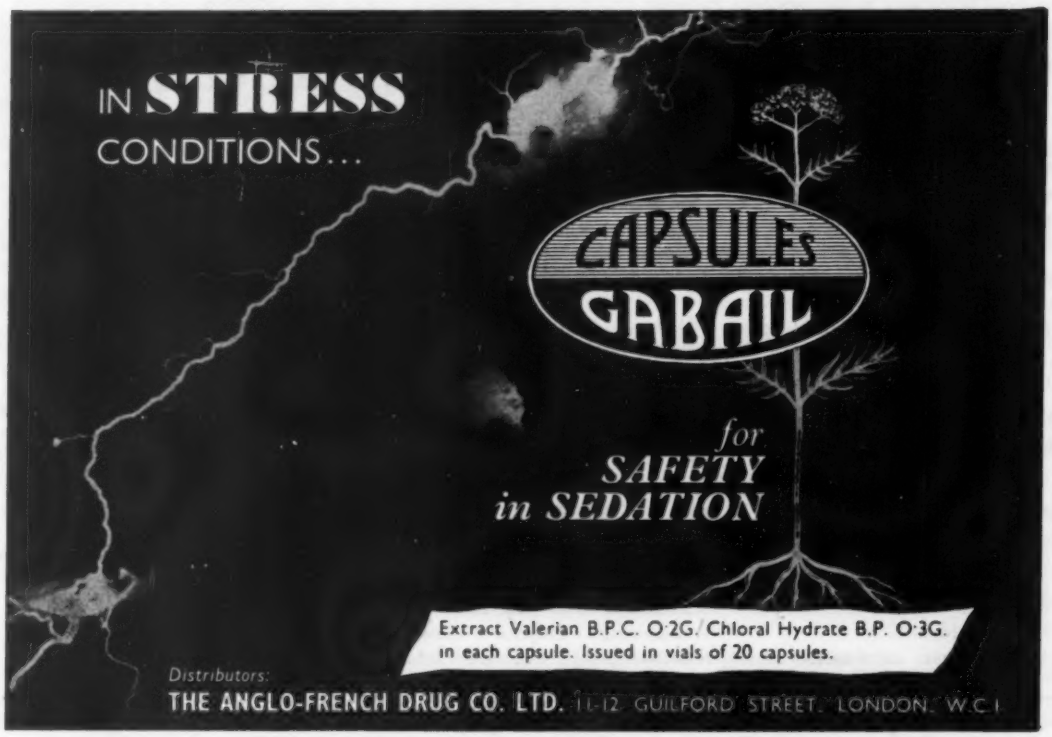
Increasing demands on the practitioner's time make the rapid control of asthma a matter of primary importance FELSOL has for years been relied upon by doctors in all parts of the world to which it has been introduced, for the immediate and prolonged relief it gives in BRONCHOSPASM. Easy to take, FELSOL gives full relief in perfect safety (even in cardiac cases) without morphia or other narcotics.

★ NON-CUMULATIVE

★ NO CONTRA-INDICATIONS

Clinical sample and literature on request.

BRITISH FELSOL COMPANY LTD., 206/212 ST. JOHN STREET, LONDON, E.C.1


IN STRESS CONDITIONS...
CAPSULES GABAIL
for SAFETY in SEDATION
Extract Valerian B.P.C. 0·2G. Chloral Hydrate B.P. 0·3G. in each capsule. Issued in vials of 20 capsules.
Distributors:
THE ANGLO-FRENCH DRUG CO. LTD. 11-12 GUILFORD STREET, LONDON, W.C.1

HENRY KIMPTON'S PUBLICATIONS

New (7th) Edition — Just Ready

TRAQUAIR'S CLINICAL PERIMETRY

Edited by **G. I. SCOTT**, M.A., M.B., Ch.B., F.R.C.S.(Ed.)

SEVENTH EDITION, REVISED AND ENLARGED

10" × 7½" 333 Pages 280 Illustrations, including 5 Coloured Plates Cloth Price **60s.** net

New Book — Just Ready

TUMOR SURGERY OF THE HEAD AND NECK

By **ROBERT S. POLLACK**, M.D., F.A.C.S.

10" × 7" 101 Pages 40 Illustrations Cloth Price **37s. 6d.** net

New Book — Now Ready

ALCOHOLISM

A Treatment Guide for General Practitioners

By **DONALD W. HEWITT**, M.D.

9½" × 6" 121 Pages Cloth Price **22s. 6d.** net

THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS

By **PAUL DUFAULT**, M.D.

SECOND EDITION

426 pages 161 Illustrations Price **67s. 6d.** net

CLINICAL TOXICOLOGY

The Clinical Diagnosis and Treatment of Poisoning

By **S. LOCKET**, M.B., B.S., M.R.C.P.(Lond.). With Special Sections by W. S. M. GRIEVE, M.Sc., Ph.D., F.R.I.C., and S. G. HARRISON, B.Sc.

784 Pages 27 Illustrations, including 2 Coloured Plates Price **£5 5s.** net

New (10th) Edition — Now Ready

DISEASES OF THE NOSE, THROAT AND EAR

By **HOWARD CHARLES BALLENGER**, M.D., F.A.C.S., and **JOHN J. BALLENGER**, B.S., M.S., M.D.

TENTH EDITION, REVISED

9½" × 6" 968 Pages 550 Illustrations and 11 Plates Cloth Price **£6 6s.** net

134 Gt. Portland Street **HENRY KIMPTON** **London, W.1**

Medical Book Department of Hirschfeld Brothers Ltd.

NEW THIS MONTH

PARAPSYCHOLOGY: Frontier Science of the Mind
By J. B. RHINE and J. G. PRATT. 232 pages, 10 illustrations. **37s. 6d.**

PRINCIPLES OF OPHTHALMOSCOPY
By J. K. ERBAUGH. 112 pages, 31 illustrations. **42s.**

PRACTICAL CLINICAL CHEMISTRY
By ALMA HILLER. *Second Edition.* 320 pages, 13 tables. **30s.**

HYPNOGRAPHY: A Study in the Therapeutic Use of Hypnotic Painting
By AINSLIE MEARES. 288 pages, 385 illustrations. **58s. 6d.**

MARRIAGE AND PERSONALITY
By AINSLIE MEARES. 168 pages. **30s.**

PSYCHIATRY AND THE CRIMINAL
By J. M. MACDONALD. 240 pages. **42s.**

THE HUMAN EAR CANAL
By ELDON T. PERRY. 120 pages, 50 illustrations. **36s.**

METHODS OF QUANTITATIVE RADIOCHROMATOGRAPHY AS APPLIED TO THE STUDY OF INTERMEDIATE METABOLISM
Edited by E. B. CHAIN. 248 pages, 71 illustrations. **57s. 6d.**

THE APPLICATION OF INTERMEDIATE CARBOHYDRATE METABOLISM AND REVIEW OF THE MODE OF ACTION OF INSULIN
Edited by E. B. CHAIN. 216 pages, 30 illustrations. **57s. 6d.**

CLINICAL AND IMMUNOLOGIC ASPECTS OF FUNGOUS DISEASES
By J. W. WILSON. 296 pages. **51s.**

BLACKWELL
SCIENTIFIC PUBLICATIONS

Rybar Benzocaine Calamine Cream

R.B.C.

Safe, Soothing, Sedative

R.B.C. is of great value in the treatment of eczematous conditions, pruritus, tinea and other skin infections due to bacteria or fungi. The soothing effect produced on the application of R.B.C. in cases of intractable itching materially assists healing by promoting sleep and preventing rubbing and scratching.

Formula :—	
Phenylmercuric Nitrate	0.10%
Iso-butyl para-aminobenzoate	1.00%
N-butyl para-aminobenzoate	1.00%
Benzocaine	8.00%
Cholesterol	0.10%
Calamine	10.00%
Hydrophilic Base to	100.00%

All percentages w/w

Mode of issue : Collapsible tubes containing 25 gms.
May be prescribed on Form E.C.10.

Professional sample and literature on request from :

RYBAR LABORATORIES LTD.
TANKERTON · KENT

PRBT

*B 1

The FIRST CHOICE
and the LAST RESORT
for those 'difficult' urinary infections

℞ **furadantin**
REGD.

'Furadantin' brand nitrofurantoin is neither sulphonamide nor antibiotic. It is active against most of the pathogenic bacteria likely to infect the urinary tract. The usual adult dose is two tablets four times daily. Crystalluria does not occur.

'FURADANTIN' is manufactured by a Registered User of the trade mark under licence from the Norwich Pharmacal Company (Eaton Laboratories Division).

DUNCAN FLOCKHART OF EDINBURGH
'The Doctors' House'

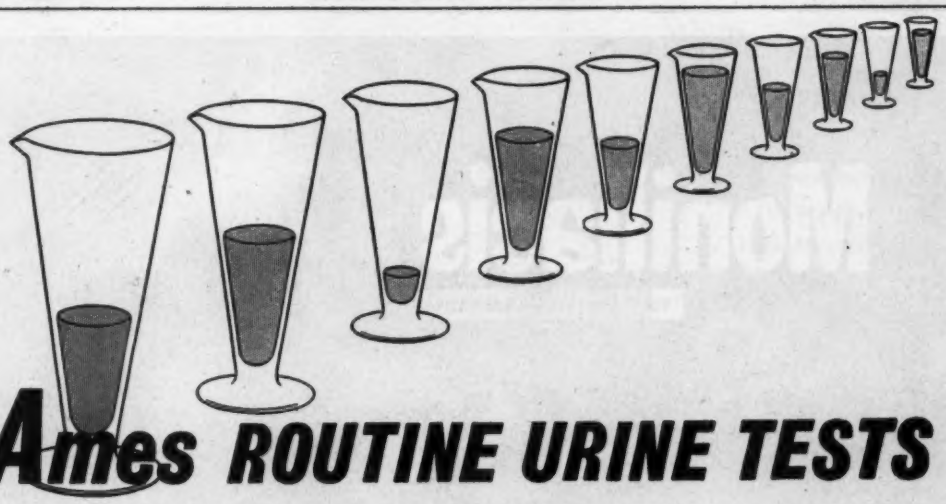
Duncan, Flockhart & Co. Ltd., Edinburgh 11 LFU 11/57 M

in any circumstance... control that cough with **BROMODEINE**
TRADE MARK

Pleasant-tasting, soothing Bromodeine controls coughing without eliminating the cough reflex. The bromoform and codeine have an anti-spasmodic, sedative effect; while congestion and irritation in chest and throat are relieved by extracts of wild cherry, senega and krameria. Bromodeine is suitable for adults and children of all ages.

FORMULA: Bromof. B.P.C. 0·85%, Codeine Hydrochlor. B.P.C. 0·25%, Krameria, B.P.C., Prunus Serotina, B.P.C., Senega B.P.C., as liquid extracts each of 1·14%.
BOTTLES: 2 oz., 4 oz., 16 oz., 80 oz.
BASIC N.H.S. COST: 10½d. per fl. oz.

THE CROOKES LABORATORIES LIMITED · PARK ROYAL · LONDON NW10



Ames ROUTINE URINE TESTS

– Reliable, quick, no external heating –

For **ALBUMIN** _____ **ALTEST***
reagent tablets

For **BLOOD** _____ **OCCULTEST***
reagent tablets

For **GLUCOSE** _____ **CLINISTIX***
reagent strips

For **BILIRUBIN** _____ **ICTOTEST***
reagent tablets

For **KETONES** _____ **ACETEST***
reagent tablets

. . . and, of course, for reliable estimation of

SUGAR _____ **CLINITEST***
reagent tablets

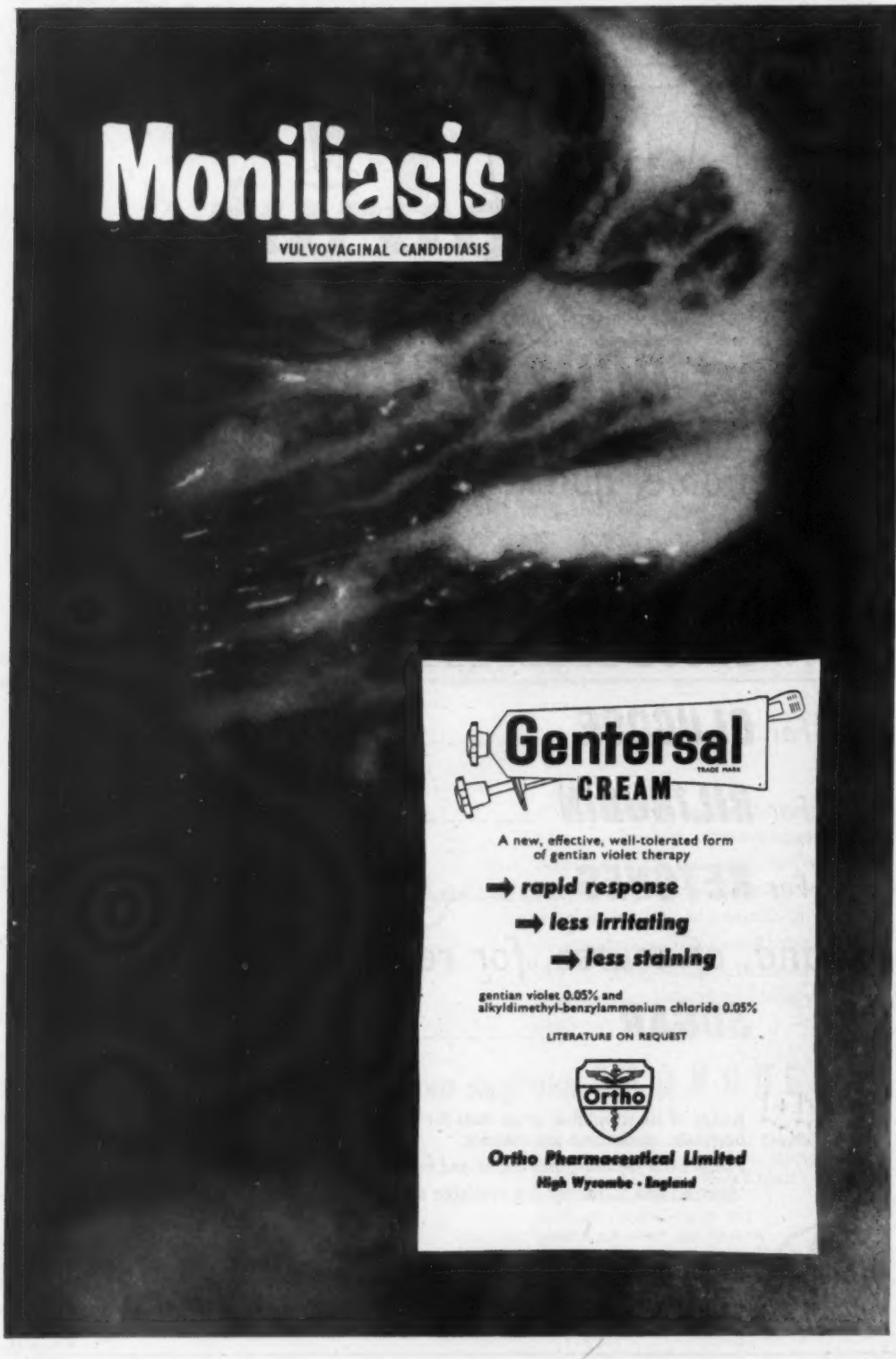
Range of six simplified urine tests for General Practitioners, hospitals, clinics and laboratories.

Please write for illustrated leaflet and references.

'Acetest' and 'Clinitest' are available under the N.H.S. on Form E.C.10.

AMES COMPANY (LONDON) **LTD.**
NUFFIELD HOUSE, PICCADILLY, LONDON, W1 *Telephone: REGent 5321*

* *Trade Marks*


Moniliasis
VULVOVAGINAL CANDIDIASIS
Gentersal
TRADE MARK
CREAM
A new, effective, well-tolerated form of gentian violet therapy
➡ rapid response
➡ less irritating
➡ less staining
gentian violet 0.05% and alkyldimethyl-benzylammonium chloride 0.05%
LITERATURE ON REQUEST
Ortho
Ortho Pharmaceutical Limited
High Wycombe • England

Aspirin Sensitivity?

Constipation, gastric irritation, allergy and other undesirable side effects may follow the use of analgesics based on the aspirin-codeine-phenacetin formula. Panadol does not contain any of these substances but has the single active ingredient N-acetyl-p-aminophenol. It does not cause gastric irritation or constipation and may safely be given to patients with peptic ulcer and to those who are intolerant of other analgesics.

Medical literature is available on request.

Panadol

is safe for everyone

Tablets: 0.5 G., N-acetyl-p-aminophenol. In cartons of 20, in bottles of 100 and 500, and in tins of 2500.
Basic N.H.S. cost of continuous treatment (2 tabs. t.d.s.) for one week 3/5.

Bayer Products Limited
Neville House, Kingston-on-Thames, Surrey.
Associated exporting company: Winthrop Products Limited

BAYER

PANADOL is a registered trade mark.

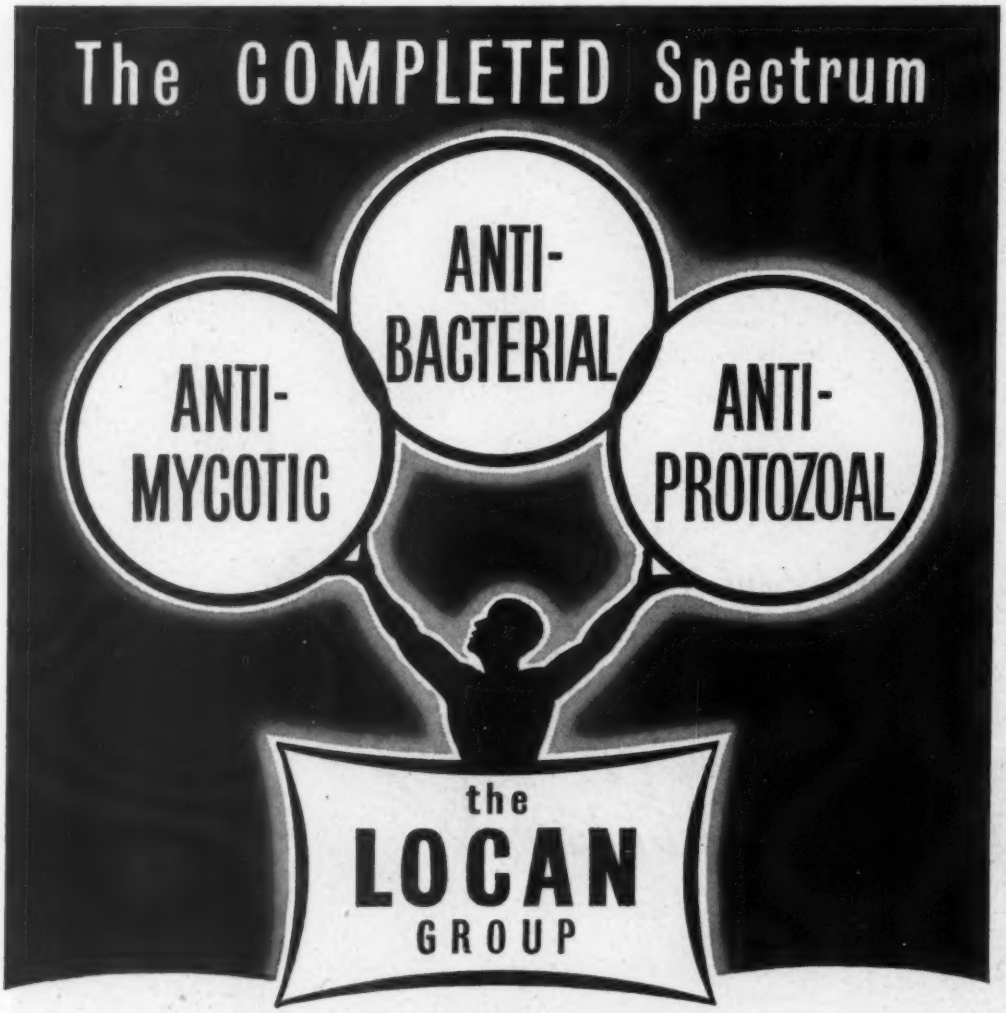
If it's oral penicillin it's Eskacillin

Eskacillin V

Eskacillin 100 *Eskacillin Sulpha*

SMITH KLINE & FRENCH LABORATORIES LTD COLDHARBOUR LANE, LONDON SE5

ECV:PA18 *'Eskacillin' is a trade mark*



Bacteriological and clinical investigation has amply confirmed the recent, unexpected discovery[1] *that amethocaine and amylocaine, alone amongst the commonly used local anaesthetics, possess a wide range of antimicrobial activity, showing at levels ordinarily used in topical application, marked activity against all the usual pathogenic organisms, including a notable action against trichomonas vaginalis, trichomonas hominis and Monilia (candida albicans).*

The LOCAN Group consists of preparations incorporating the combined anti-infective and anaesthetic properties of amethocaine and amylocaine, and individually formulated to meet the special needs of the conditions for which they are indicated. **LOCAN Pessaries** rapidly control infection and relieve discomfort in trichomonal and monilial vaginitis and are compatible with the normal vaginal physiology. **LOCAN Suppositories** give immediate relief of pain and irritation, combat infection and promote healing in haemorrhoids and other anal and rectal conditions. **LOCAN Cream** is an antiseptic and non-greasy cream for the prompt and prolonged soothing relief of local pain and irritation.

[1] 1957, J. Pharm. & Pharmacol, 9, 431.
1957, Lancet, II, 1028.

· ALLIED LABORATORIES LTD · LONDON

. . . and though there are many—perhaps too many—analgesics available to the practitioner, the balanced properties of Hypon make it a tablet far more effective than most. Extensive tests show that Hypon has the power not only to relieve pain but to do so very rapidly. Constipation, so often encountered following the administration of codeine is effectively counteracted by the addition of phenolphthalein. Caffeine offsets the depressing effects of aspirin and phenacetin. Hypon is invaluable where prolonged administration is called for (chronic rheumatic conditions for instance). Furthermore, the antipyretic properties of Hypon tablets are of particular value in the treatment of the febrile states of influenza, tonsillitis . . .

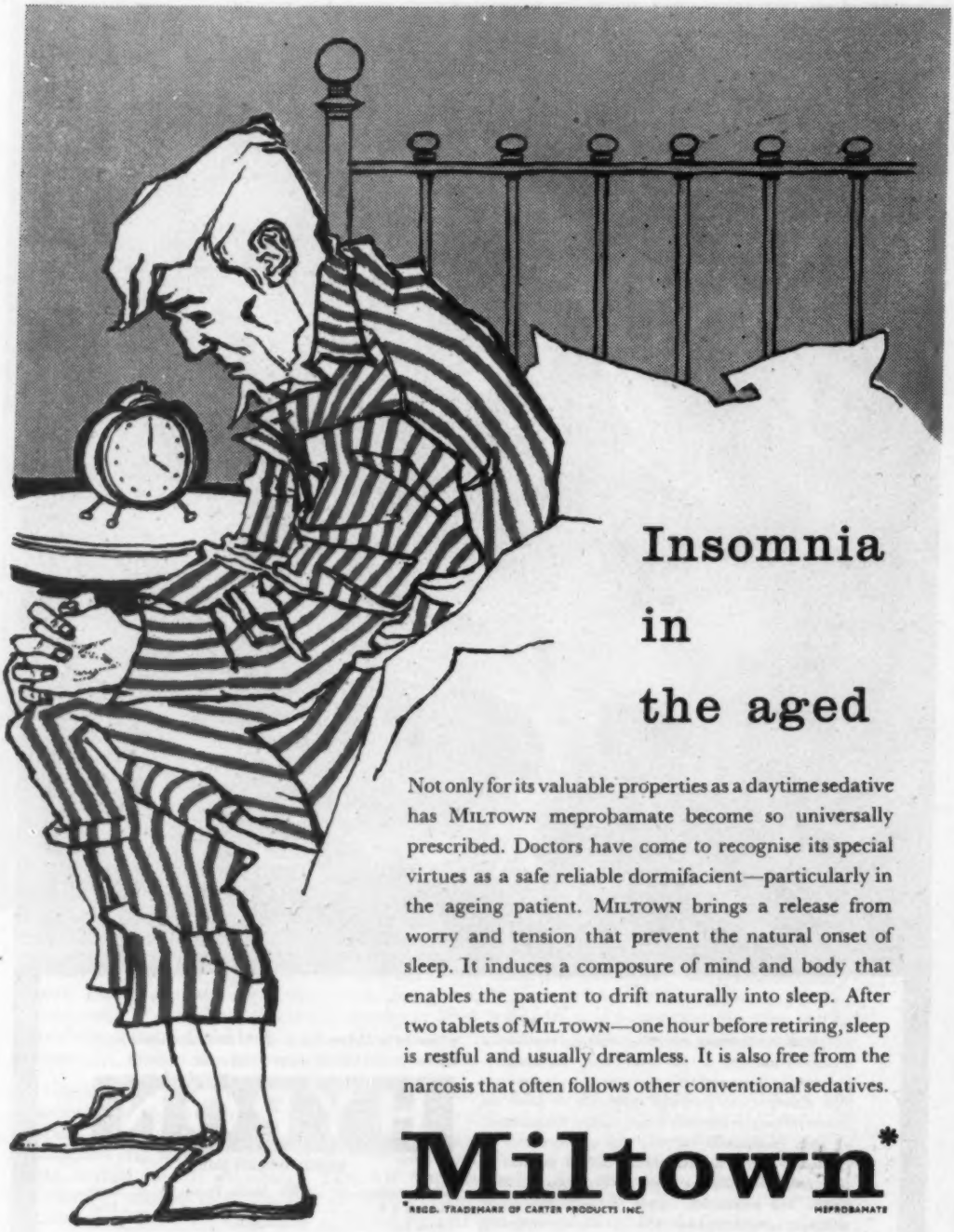
HYPON

rapidly relieves pain

Acid Acetylsalicyl. B.P.	40.22%	Codein. Phosph. B.P.	0.99%
Phenacet. B.P.	46.00%	Phenolphthal. B.P.	1.04%
Caffein. B.P.	2.00%	Excip.	7.75%

(Each tablet 5 grains)

CALMIC LIMITED · Crewe: *Crewe 3251-5* London: *2 Mansfield Street · W1 · Langham 8038-9*



Insomnia in the aged

Not only for its valuable properties as a daytime sedative has MILTOWN meprobamate become so universally prescribed. Doctors have come to recognise its special virtues as a safe reliable dormifacient—particularly in the ageing patient. MILTOWN brings a release from worry and tension that prevent the natural onset of sleep. It induces a composure of mind and body that enables the patient to drift naturally into sleep. After two tablets of MILTOWN—one hour before retiring, sleep is restful and usually dreamless. It is also free from the narcosis that often follows other conventional sedatives.

Miltown*

*REGD. TRADEMARK OF CARTER PRODUCTS INC. MEPROBAMATE

Oral tablets of 400 mg. Bottles of 50 and 500

Lederle

LEDERLE LABORATORIES DIVISION

Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

Night attack

The angina patient goes to bed in fear and may wake in agony. Peritrate prophylaxis can ease his mind considerably. Since Peritrate is a *long-lasting* coronary vasodilator, a single dose affords protection for as long as 4 to 5 hours . . . a considerable part of the night. Peritrate will not abort attacks completely — but it prevents attacks or reduces their severity in up to 80% of cases. Exercise tolerance is increased, nitroglycerin intake is reduced and very few side-effects occur.

Active principles: Pentaerythritol tetranitrate 10 mg.

Packing: Bottles of 50 tablets and packs of 500 supplied to chemists for dispensing only.

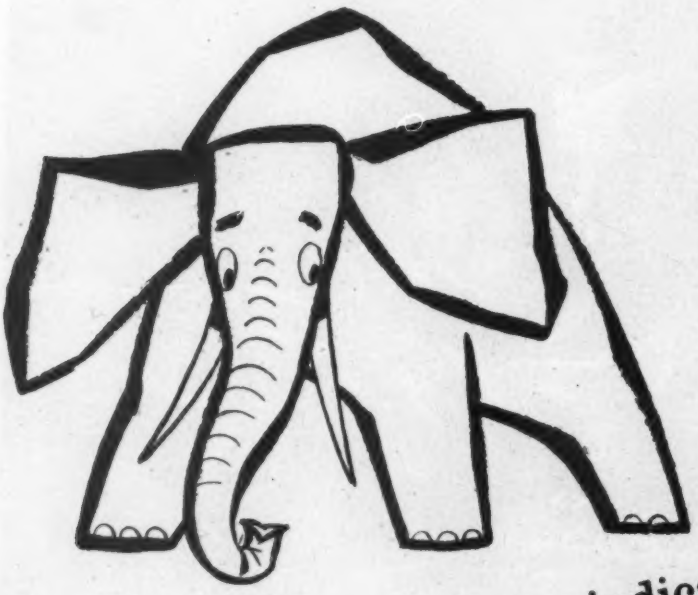
PERITRATE WITH PHENOBARBITONE (Peritrate 10 mg. with Phenobarbitone 15 mg.) is also available, similarly packed.

Peritrate

Trade Mark

WILLIAM R. WARNER & CO. LTD., EASTLEIGH, HAMPSHIRE

PER 277/4



Where large doses are indicated . . .

Ce-K-Sal tablets contain soluble aspirin to provide rapid absorption without gastric irritation, with the protective Vitamin C for its detoxifying effect and value in febrile disease and Vitamin K for counteracting haemorrhagic tendencies induced by prolonged and intensive acetylsalicylic acid therapy.

FORMULA: *Each tablet contains soluble aspirin equivalent to acetylsalicylic acid 325 mg. (gr. 5), ascorbic acid (Vitamin C) 20 mg., acetomenaphthone (Vitamin K) 0.35 mg.*

Ce-K-Sal

SAFE SOLUBLE ASPIRIN

Literature and samples on request

PAINES & BYRNE LTD., PABYRN LABORATORIES, GREENFORD, MIDDLESEX

but NOW there is ALBUCID NASAL SPRAY

actual size

The patient with a cold wants immediate relief from nasal stuffiness and to be rid of the cold as soon as possible. The uncomfortable symptoms and secondary bacterial infection can be controlled by Albucid Nasal Spray.

Albucid Nasal Spray contains the ideal bacteriostat for application to delicate mucous membrane, together with a vasoconstrictor to give prompt and prolonged symptomatic relief. The inclusion of a spreading agent ensures that the whole of the inflamed mucous membrane receives the benefit of treatment. Albucid Nasal Spray is a clear, aqueous solution and is pleasant to use.

Formula:
ALBUCID
(Sulphacetamide Sodium) 7.5%
Ephedrine Hydrochloride 1.0%
in neutral aqueous solution containing a spreading agent
Spray containers of 14 c.c.

ALBUCID NASAL SPRAY

a product of British Schering Limited, London, W.8.

The esters of NICOTINIC, SALICYLIC and p-AMINOBENZOIC acids bring relief to cases of arthritis and rheumatism

"Thank you, doctor"

IN CASES OF soft-tissue rheumatism, and arthritic disorders, many doctors are tending more and more to regard Transvasin as an indispensable adjuvant to treatment.

For Transvasin is composed of the esters of nicotinic, salicylic and p-aminobenzoic acids. These esters readily pass the skin barrier in therapeutic quantities, and so enable an effective concentration of drugs to be built up where they are needed.*

Transvasin not only induces vasodilation of the skin with a superficial erythema, but also brings about a deep hyperaemia of the underlying tissues. It is non-irritant and can be safely used on delicate skins.

It is now being widely prescribed, with successful clinical results. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low.

**Therapeutische Umschau VIII, 1952, 8, 143.*

Tetrahydrofurfuryl salicylate	14%
Ethyl nicotinate	2%
n-Hexyl nicotinate	2%
Ethyl p-aminobenzoate	2%
Water-miscible cream base ad	100%

Transvasin is available in 1 oz. tubes, basic N.H.S. price 2/6 plus P.T., and is not advertised to the public. Samples and literature will be gladly sent on application.

LLOYD-HAMOL LTD

11 Waterloo Place, London, S.W.1. Tel. WHitehall 8654/5/6

Transvasin is the registered trade mark of Lloyd-Hamol Ltd.

balanced

vitamin intake

with a single

daily dose

ABIDEC

DROPS in bottles of 10ml. and 50ml. each with marked dropper.

CAPSULES in bottles of 30 and 250

ABIDEC* **DROPS** provide in an easily administered single daily dose (infants 0.3ml., older children 0.6ml.) a comprehensive daily vitamin supply during infancy and childhood. Abidec drops are miscible with milk and fruit juices and can be administered by feeding-bottle without clogging the teat or separating out. This preparation provides vitamins A and D with vitamin C and members of the vitamin B complex, in proportions recommended by the Nutrition Committee of the B.M.A. (1950).

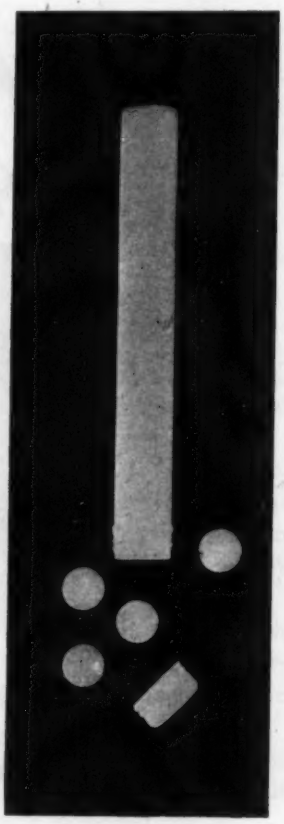
ABIDEC CAPSULES, administered in one daily dose of one capsule, contain the same vitamins but in proportions designed for older children and adults, particularly during those periods when requirements are above normal or intake deficient.

* *Trade Mark*

PARKE, DAVIS & COMPANY LIMITED *(Inc. U.S.A)* HOUNSLOW, MIDDLESEX. Telephone: Hounslow 2361

15 66

In cases of spasmodic dysmenorrhoea



Prophylactically, a course of tablets starting a day or two before the expected flow will give

complete relief in most cases. BUSCOPAN is a completely safe spasmolytic giving rise to none of the unpleasant side effects normally associated with drugs of this nature.

BUSCOPAN gives rapid relief from pain associated with Spasmodic Dysmenorrhœa. When pain is severe, an intramuscular injection followed in four hours by oral administration *(2 tablets three times a day)* will give prolonged relief.

Other Indications

Gastric or duodenal ulcer, spasmodic disorders of the gastro-intestinal tract, biliary colic and delayed relaxation of the lower uterine segment.

BUSCOPAN*

Hyoscine-N-Butylbromide

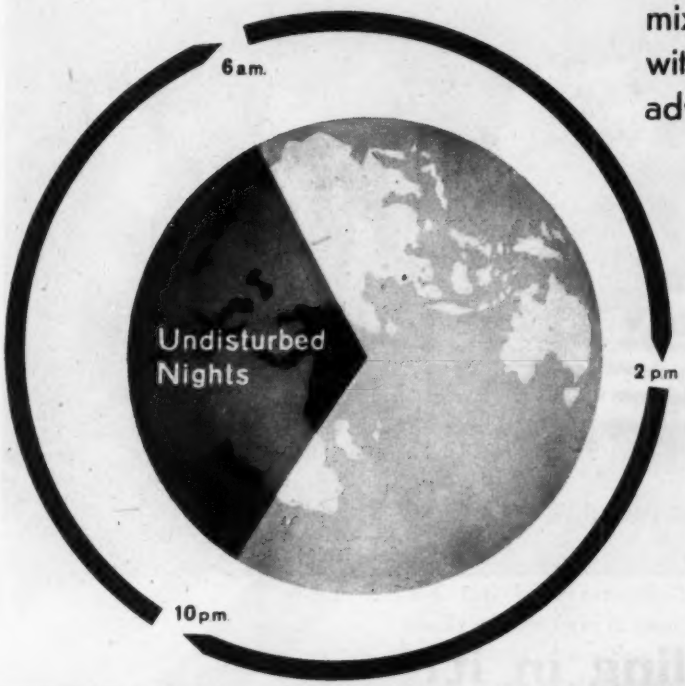
Manufactured and distributed in the U.K. by Pfizer, Ltd., Folkestone, Kent, for

C. H. Boehringer Sohn, Ingelheim am Rhein.

Registered Proprietors of the Trade Mark. * *Regd. Trade Mark.*

New Dosulfin®

a long-acting mixed Sulphonamide with the following advantages

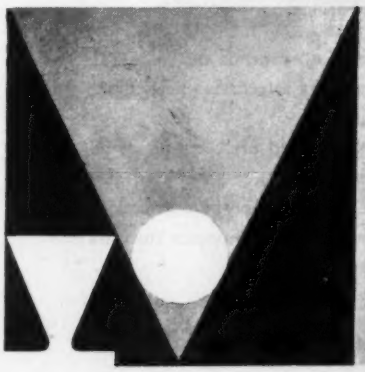


Long dosage intervals

Undisturbed nights

Low dosage

Further details on request



Availability

Tablets 0.75 g.
Containers of
12 and 100

Syrup 10%
(with measure)

Bottles 50 ml.

® Regd. Trade Mark

Dosulfin consists of equal parts of Sulphaproxyline and Sulphamerazine

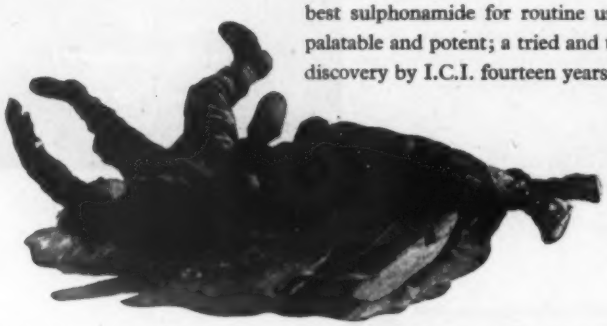
Geigy Pharmaceutical Company Ltd.
Manchester 23

PH 121
17

Revelling in it!

AMAZING how fit boys and girls can be at weekends and holidays! And then comes Monday with respiratory infections – bronchitis, temperatures, sometimes even pneumonia.

Get the young blighters back to school and play, as quickly as possible, with S-mez. S-mez is ideal for children – the safest and best sulphonamide for routine use; swift and positive in action, palatable and potent; a tried and trusty friend, unbeaten since its discovery by I.C.I. fourteen years ago.



'S-MEZ'
Trade Mark
is short for
'Sulphamezathine'
Sulphadimidine B.P.

IMPERIAL CHEMICAL INDUSTRIES LIMITED Pharmaceuticals Division Wilmslow Cheshire
Ph 756

Higher levels

...even faster

WITH THE NEW IMPROVED PENICILLIN - V

'V-CIL-K' brand penicillin-V potassium is a new and readily soluble form of penicillin-V giving faster and higher blood levels. Fasting levels have in fact been shown to be even higher than those obtained with parenteral penicillin G in the same dosage.

'V-CIL-K', the oral penicillin with the parenteral penicillin response, is a major advance in penicillin therapy. The average dose is 125 mg. four times daily, increased in severe infections. The cost is identical with that of penicillin-V.

'V-CIL-K' is available as tablets of 125 mg. and 250 mg.

'V-CIL-K'

PENICILLIN V POTASSIUM

Lilly

ELI LILLY & COMPANY LTD. BASINGSTOKE ENGLAND

19

Calcipen-V SUSPENSION

Calcipen-V Suspension is a palatable, *ready-prepared* suspension of calcium penicillin V, containing the equivalent of 60 mg. of penicillin V in each 5 ml. It is supplied in bottles of 60 ml. Calcipen-V is also supplied as tablets containing the equivalent of 60, 120 or 240 mg. of penicillin V. Professional sample and detailed literature gladly sent on request.

BOOTS PURE DRUG CO. LTD., NOTTINGHAM, ENGLAND

Boots

NEW

ENAVID*

BRAND OF NORETHYNODREL AND ETHYNYLOESTRADIOL 3-METHYL ETHER

For the specific control of menstrual irregularities

ENAVID, containing the new Searle steroid norethynodrel, permits *specific* and usually complete *control* of the menstrual cycle on *oral* administration and thus provides effective therapy for most menstrual irregularities.

ENAVID has strong progestational and a lesser oestrogenic activity on the endometrium, which stimulates its development to a secretory phase. It also inhibits the secretion of gonadotropins by the anterior pituitary gland.

ENAVID is therefore recommended for:

- **AMENORRHOEA** (Primary and Secondary)
- **OLIGOMENORRHOEA**
- **MENORRHAGIA**
- **METRORRHAGIA**
- **DYSMENORRHOEA**
- **PREMENSTRUAL TENSION** and the
- **"INADEQUATE LUTEAL PHASE"**

ENAVID is supplied as 10 mg. tablets in bottles of 20 and 50 tablets.

Detailed literature is available on request.

* *Trade Mark.*

SEARLE

G. D. SEARLE & CO., LTD., HIGH WYCOMBE, BUCKS. Tel. High Wycombe 1770

EN : PI17

21

"ASPEN V"

'Aspen V' is a unique combination of Penicillin V with Aspirin and Glycine and has been compounded to treat infections caused by pathogenic organisms which are sensitive to Penicillin V.

The marked antibiotic activity of 'Aspen V' is combined with the antipyretic, diaphoretic and analgesic properties of the contained Aspirin. The capsule is well tolerated by patients suffering from peptic ulcer. 'Aspen V' does not irritate the gastric mucosa.

INDICATIONS

Infections caused by Penicillin sensitive organisms and accompanied by pain and fever; for example, otitis media, boils, carbuncles, pharyngitis, bronchitis and other upper respiratory tract infections.

DOSAGE

The average adult dose is:
1 capsule 4 times daily in mild infections.
2 capsules 4 times daily in moderate infections.
In serious infection the dose may be increased to
2 capsules every 4 hours.

PACKING

Capsules 'Aspen V' are available in bottles of 10 and 100.

COMPOSITION

Penicillin V (Phenoxymethyl Penicillin)	125 mgm.
Acetyl Salicylic Acid (Aspirin)	5 grs.
Aminoacetic Acid (Glycine)	2 grs.

A UNIQUE COMBINATION OF **ASPIRIN** *and* **GLYCINE** *WITH* **PENICILLIN V**

INDEPENDENT RESEARCH LABORATORIES
LONDON, W.C.2

NACTON

COMPOUND I.S. 499

BENCARD

a new, long-acting

INHIBITOR OF GASTRIC SECRETION

which, when given orally, reduces gastric secretion remarkably, and without side-effects in full therapeutic doses

Nacton promises to be of unusual value in the treatment of peptic ulcer. One dose every six hours provides continuous reduction of acidity.

Previously reported as Compound I.S. 499 (*Brit. med. J.*, ii, 275, 1957), Nacton is now available on National Health Service prescriptions.

PRESENTATION *Tablets each containing 2 mg. of (1-methyl-2-pyrrolidyl) methyl benzilate methyl methosulphate. Containers of 50, 250 and 1,000 tablets.*

LITERATURE AVAILABLE FROM

C. L. BENCARD LTD., PARK ROYAL, LONDON, N.W.10

601/80/2

NEW PRODUCTS FROM VITAMINS LIMITED

1 *A derivative of natural vitamin E*

Most single vitamins have been available to the profession for many years in forms acceptable as pharmaceutical preparations.

Vitamin E has presented difficulties. Natural sources, e.g. wheat germ and wheat germ oil, do not contain high enough concentrations: synthetic vitamin E, while useful, has not proved uniformly effective. The chemistry of vitamin E has now been elucidated after years of exhaustive research and the active isomers are known. It has thus become possible to present tablets of stable, high activity in the form of dextro-alpha tocopheryl succinate, derived from natural vitamin E. Each tablet of 200 mg. has an activity of 242 i.u. vitamin E.

This achievement means that Vitamins Limited can now offer to the profession a preparation to meet a long-continued demand.

DAL-TOCOL

PACKS: Tablets in packs of 100 and 500

2 *Modified Phenobarbitone Therapy*

SEDATION WITHOUT DEPRESSION

TROPENAL is a combination of phenobarbitone with vitamins of the B complex and vitamin C. Its formula has been designed to take advantage of the fact that many of the side-effects of barbiturates are inhibited by the simultaneous administration of generous doses of these vitamins. Phenobarbitone is excreted only slowly, continued administration causing tissue retention. As the drug is slowly released from this tissue reservoir there is an increasing risk of toxic side-effects unless there is a concomitant high concentration of the necessary vitamins. By judicious combination it becomes possible to prescribe phenobarbitone for those conditions in which it is properly indicated for prolonged periods without the development of depression, headache and tremor which are such common features of long-continued treatment. (Skin sensitivity is unaffected.)

The commoner indications for Tropenal are thus: epilepsy, anxiety states, especially those accompanied by insomnia and restlessness, and alcohol withdrawal.

TROPENAL

FORMULA: *Each tablet contains:*

Aneurine hydrochloride	B.P.	5 mg.
riboflavine	B.P.	5 mg.
pyridoxine	B.P.C.	2 mg.
nicotinamide	B.P.	15 mg.
ascorbic acid	B.P.	50 mg.
phenobarbitone	B.P.	16 mg. (¼ gr.)

DOSAGE
One to four tablets daily

PACKS
Tablets in packs of 100 and 500

VITAMINS LIMITED UPPER MALL, LONDON, W.6.

In the treatment of migraine . . .

* **Femergin**

TABLETS
1 mg. Ergotamine Tartrate B.P.

AMPOULES
0.5 mg. Ergotamine Tartrate B.P./ml.

Cafergot

TABLETS
1 mg. Ergotamine Tartrate B.P.
100 mg. Caffeine B.P.

SUPPOSITORIES
2 mg. Ergotamine Tartrate B.P.
100 mg. Caffeine B.P.
0.25 mg. total alkaloids of belladonna
100 mg. isobutylallyl barbituric acid

Dihydroergotamine

SOLUTION
2 mg. dihydroergotamine methanesulphonate/ml.

AMPOULES
1 mg. dihydroergotamine methanesulphonate/ml.

"If ergotamine tartrate
by itself is not effective,
it may be more effective when combined
with caffeine, such as Cafergot tablets
(ergotamine tartrate 1 mg., caffeine 100 mg.)
or rectal suppositories . . .

If Cafergot tablets
and rectal suppositories are used
the initial dose should not exceed
2 tablets or 1 suppository,
and the total daily dose should not exceed
6 tablets or 2 suppositories.

Some patients develop nausea
and vomiting with ergotamine tartrate,
and the newer preparation
dihydroergotamine methanesulphonate (D.H.E.45)
is less liable to produce gastric upsets
but is not so generally effective . . ."

British Encyclopaedia of Medical Practice,
Interim Supplement No. 181 — October 1957, page 12

ALL BY **SANDOZ**

* The original Ergotamine Tartrate B.P.
(marketed outside the British Isles as Gynergen)

Sandoz Products Limited

Sandoz House
23 Great Castle Street
London, W.1

"In the most advanced illnesses
the most advanced cures
Are also the most effective."
– Hippocrates

A completely effective all-purpose oral diuretic

New Era in Diuretic Therapy

For the first time, there is available a non-mercurial diuretic agent which, when administered ORALLY, is usually completely free from side-effects, has no known contra-indications, and is effective in the treatment of oedema of all degrees of severity—often when ALL other diuretics have failed.

This agent is **SALURIC**
(Chlorothiazide)

discovered in the MERCK SHARP & DOHME RESEARCH LABORATORIES

SALURIC

replaces ALL other diuretics because—

1 'SALURIC' has a wider *effective* range of clinical application than any other diuretic.

2 'SALURIC' is usually effective when all other diuretics—*including mersalyl*—have failed.

3 'SALURIC' is administered *orally*, yet can replace parenteral mercurials.

4 'SALURIC' is effective in oedema of *all grades of severity*.

5 'SALURIC' promotes diuresis of a urine containing sodium *and* chloride *in proper proportions*.

6 'SALURIC' may be used for *initial* and *maintenance therapy*. Refractoriness does not develop, even on prolonged administration.

7 'SALURIC' is readily accepted by the patient since *gastro-intestinal upsets are very rare*. Early completion of diuresis allows an uninterrupted night's sleep.

8 'SALURIC' *is not toxic*. No toxic effects have been reported even during prolonged administration.

9 'SALURIC' can be used in the presence of severe cardiac, renal or hepatic disease.

No contra-indications have been demonstrated.

The following conditions have been treated:

Congestive Cardiac Failure
The Nephrotic Syndrome
Acute and Chronic Glomerulonephritis
Ascites and Oedema due to Liver Cirrhosis
Oedema associated with Pre-eclamptic Toxaemia
Pre-menstrual Tension Oedema
Oedema associated with Obesity
Oedema induced by Adreno-cortical Steroids

Literature will gladly be supplied on request.

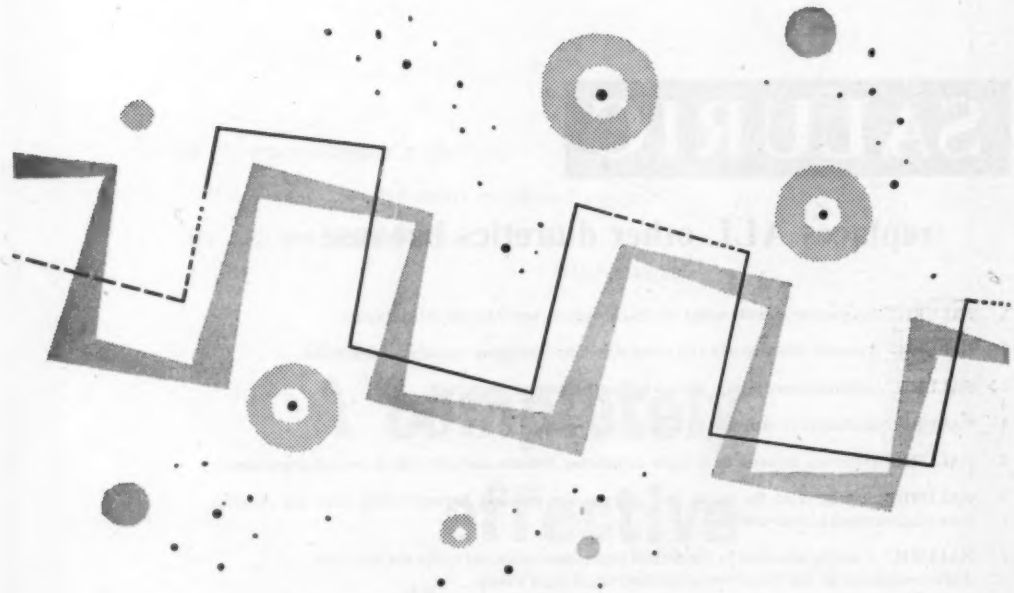
TRADE MARK

'SALURIC'

Chlorothiazide

How supplied: 0.5 G. half-scored tablets in bottles of 100 and 500. The basic N.H.S. cost of an average week's treatment for a patient on maintenance therapy is 3/9d.

MERCK SHARP & DOHME LIMITED, HODDESDON, HERTS.



'Stemetil'

trade mark *brand*

PROCHLORPERAZINE MALEATE

'Stemetil' is advocated for the prevention of attacks of migraine or to lessen their frequency or severity; for this purpose it is given continuously in a low dosage. It may also be used, in a higher dosage, at the prodromal stage, with a view to aborting the attack or relieving the symptoms. Choice of these two methods of use will depend on the frequency of the attacks. The drug is of prophylactic use in those cases wherein attacks of true migraine are induced by emotional upsets such as travelling or excitement. This is not to be confused with headache of psychogenic origin which is not true migraine and appears to be resistant to the drug. 'Stemetil' is also indicated in labyrinthine disorders including Ménière's syndrome, giddiness of other origins (except when due to streptomycin), and vomiting. Possible applications in psychiatry are being studied.

PRESENTATIONS: Tablets of 5 mg. *Suppositories of 25 mg.*

MANUFACTURED BY MAY & BAKER LTD

An M&B brand Medical Product MA4673

DISTRIBUTORS: PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM

THE PROBLEM

To obtain high blood levels of theophylline easily . . .

For oral aminophylline therapy to be fully effective it is necessary to give a dose sufficient to produce high blood theophylline levels. However, because of gastric irritation vomiting often results. Alternative therapy with enteric coated tablets or suppositories is unreliable, and parenteral aminophylline is inconvenient.

THE SOLUTION

Oral 'Theodrox' . . .

The combination of dried aluminium hydroxide gel and aminophylline in 'Theodrox' ensures full therapeutic response with the minimum of gastric upset. Reproduceable blood levels comparable with those obtained from intramuscular injection can be obtained.

THE RESULT

A full Therapeutic response . . .

THEODROX REGD.

Recent work[1,2] has shown that synthetic derivatives of theophylline are mostly unsatisfactory and all are more expensive.

Each 'Theodrox' tablet contains 3 grains aminophylline and 4 grains dried aluminium hydroxide gel. 'Theodrox' is also available combined with ⅛ grain phenobarbitone where a degree of sedation is also required.

REFERENCES

1. *Brit. Med. J.* (1957) 2: 67
2. *Ibid.*, page 74

DOSAGE . . .

ASTHMA:— two tablets, repeated in 2-3 hours if necessary to control paroxysm and dyspnœa. For prophylaxis, one tablet 4 times daily.

DIURETIC:— two tablets initially, then one or two tablets three times daily.

ANGINA PECTORIS:— four to eight tablets daily. In suitable cases 'Theodrox' with Phenobarbitone tablets can replace some or all of the 'Theodrox'.

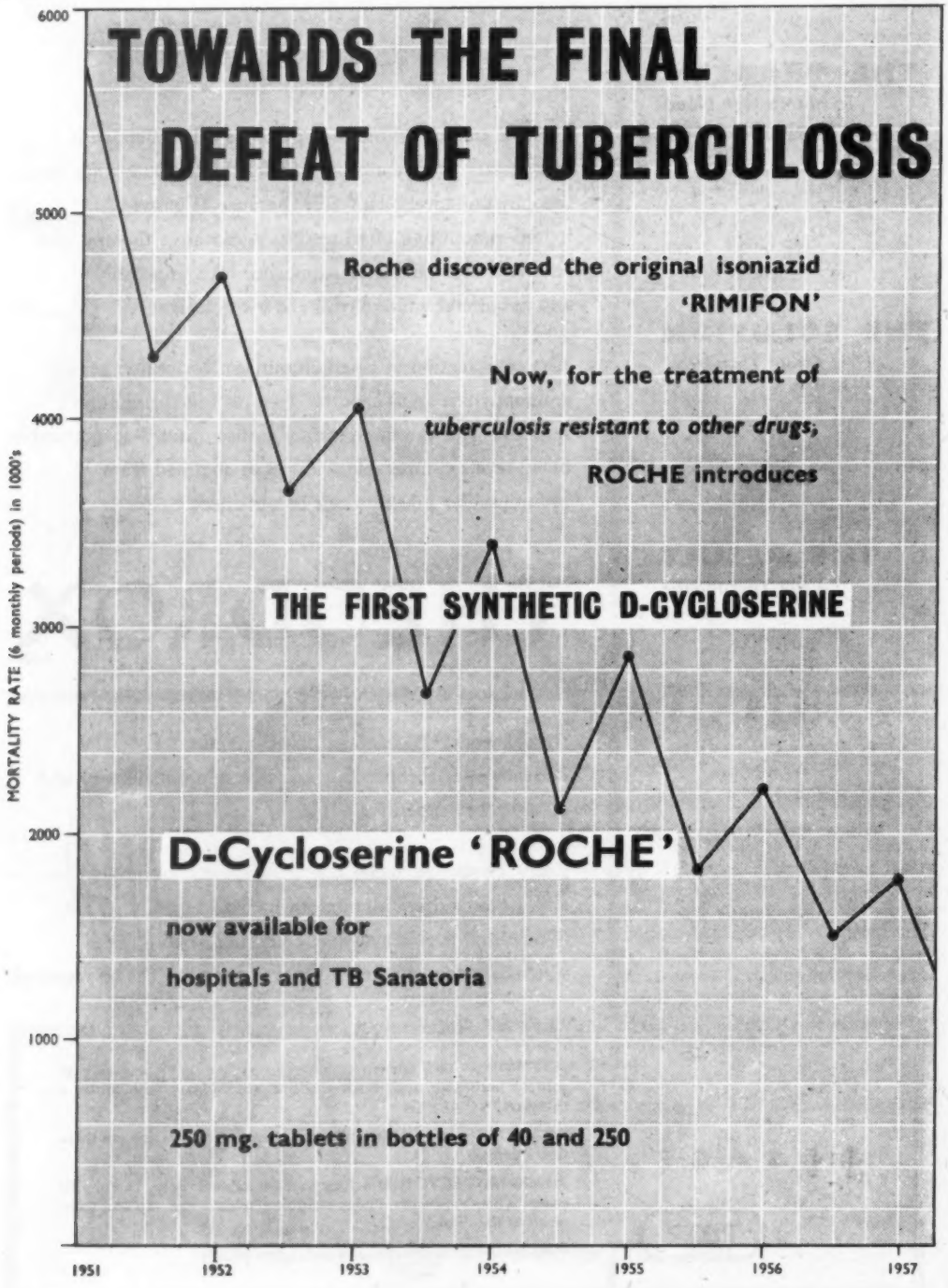
PACKS:— Bottles of 25, 100 and 1,000 tablets.

RIKER

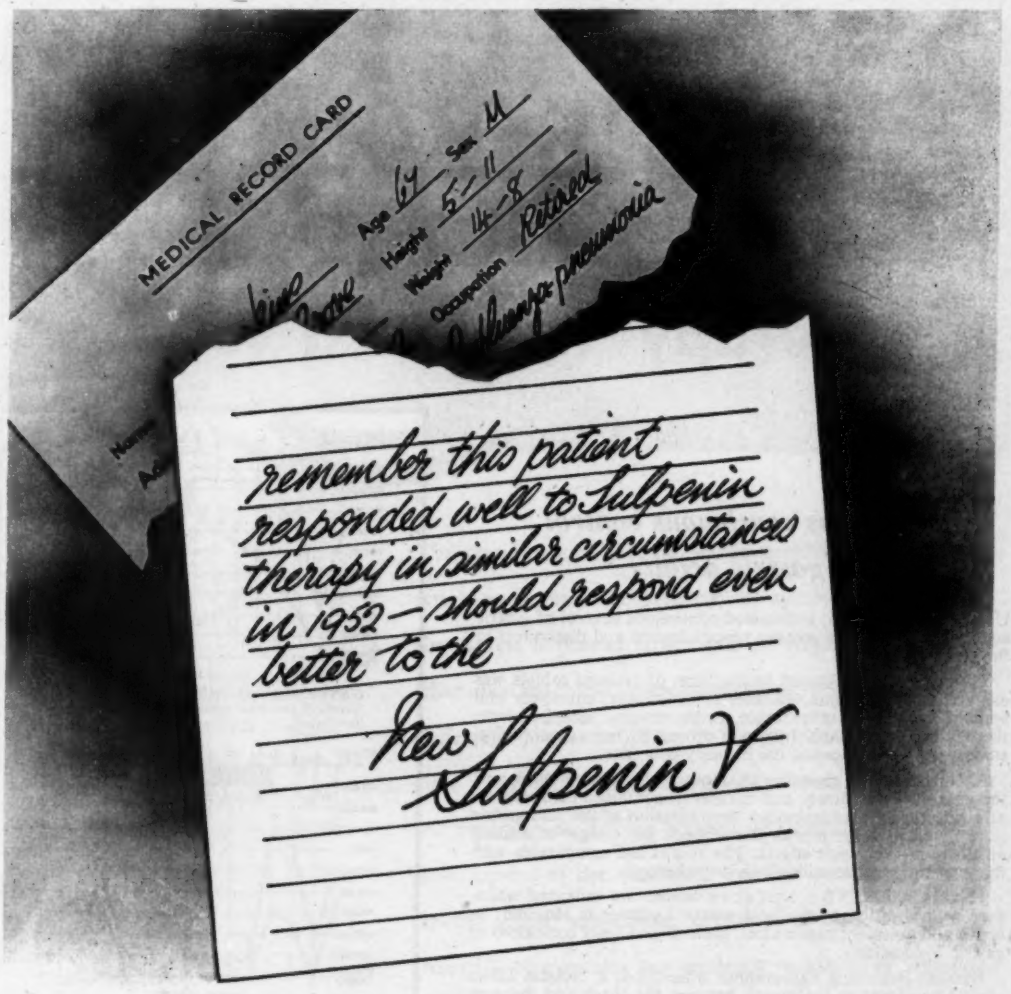
'Theodrox' (Brit. Pat. 727831) is a registered Trade Mark of

RIKER LABORATORIES LIMITED
LOUGHBOROUGH LEICS.

***B



ROCHE PRODUCTS LIMITED · 15 MANCHESTER SQUARE · LONDON W1


MEDICAL RECORD CARD
Age 64 Sex M
Height 5'-11"
Weight 14-8
Occupation Retired
remember this patient responded well to Sulpenin therapy in similar circumstances in 1952 – should respond even better to the
New Sulpenin V

★ SULPENIN V

★ *Each tablet contains:–*

PENICILLIN V 90 mg.

SULPHADIMIDINE 0·5 gramme

In tubes of 10 tablets

A L L E N & H A N B U R Y S L T D L O N D O N E 2

J57/588/4

NULACIN

provides milk-alkali drip therapy without a tube

Maintains continuous control of gastric acidity

Until a few years ago, maintained continuous control of gastric acidity was impossible without hospitalization and discomfort to the patient.

Then a unique treatment in the form of Nulacin tablets was evolved to achieve this desirable state—simply, effectively and without attendant disadvantages. In the ensuing period Nulacin therapy has been amply tried and proved by numerous clinical studies and by therapeutic use in many countries.

A Nulacin tablet placed in the mouth between the cheek and the gum dissolves slowly and releases its contained medicaments at a rate that gives continuous neutralization of the acid gastric juice. Nulacin accomplishes this without any danger of causing alkalosis or other side-effects. The results are comparable with those of intragastric milk-alkali drip therapy.

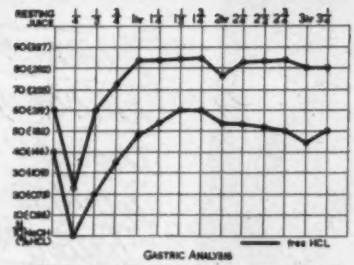
INDICATIONS: NULACIN tablets are indicated whenever neutralization of the acid gastric contents is required: in active and quiescent peptic ulcer, gastritis and other conditions of gastric hyperacidity.

Dosage: Beginning half-an-hour after food, a Nulacin tablet should be placed in the mouth between the cheek and the gum and allowed to dissolve.

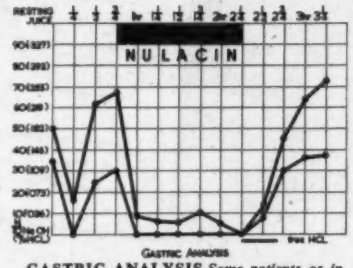
During the stage of ulcer activity, up to three tablets an hour may be required. During quiescent periods, for prophylaxis in peptic ulcer and for the relief of discomfort due to gastric hyperacidity, the dose of Nulacin is one or two tablets between meals.

NULACIN tablets are not advertised to the public and have no B.P. equivalent. They may be prescribed on E.C.10. The dispensing unit of 25 tablets is free of purchase tax. (Basic price to N.H.S. . . . 2/-). Also available in tubes of 12.

NULACIN tablets are prepared from whole milk combined with dextrins and maltose, and incorporate magnesium trisilicate 3.5 grs.; magnesium oxide 2.0 grs.; calcium carbonate 2.0 grs.; magnesium carbonate 0.5 grs.; Ol. Menth. Pip. q.s.



GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*

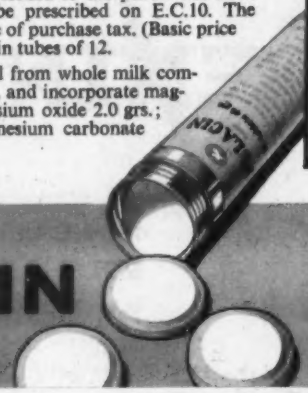


GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

BIBLIOGRAPHY

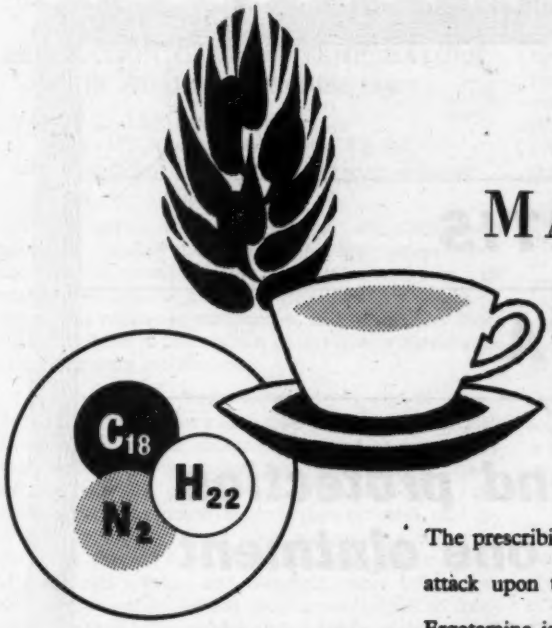
Practitioner, 1957, **178:** 43
Practitioner, 1956, **176:** 103
Amer. J. Gastro. 1956, **26:** 665
Brit. Med. J. 1954, **1:** 46

Further references to the literature and full information on Nulacin available on request.



NULACIN

HORLICKS LIMITED
PHARMACEUTICAL DIVISION
SLOUGH, BUCKS, ENGLAND



today's new MASTER PLAN *against migraine*

Each tablet contains ergotamine tartrate 2 *mgm.; caffeine (alkaloid)* 100 *mgm.; cyclizine hydrochloride* 50 *mgm.*
In bottles of 10 *and* 100

The prescribing of 'Migril' makes possible at last a *planned* attack upon the three predominant symptoms of migraine. Ergotamine is present at strength in 'Migril' for its specific effect upon the characteristic headache and ocular disturbances. Caffeine is present too, since it acts as a synergist to ergotamine. Frequently, however, ergotamine tends to evoke nausea and vomiting on its own account and can therefore worsen these aspects of the condition. For this reason, the potent, rapidly acting anti-emetic cyclizine is also included in 'Migril'—to overcome any tendency to nausea or vomiting, whether caused by the ergotamine or by the condition itself. And so successfully does cyclizine achieve this aim that truly effective oral doses of ergotamine can today be given—by means of 'Migril'.

'migril'
TRADE MARK

BURROUGHS WELLCOME & CO., LONDON
(THE WELLCOME FOUNDATION LTD.)

33

CONTACT DERMATITIS & ECZEMA

Healing and protection with one ointment

'Cobadex' the new B.D.H. preparation of hydrocortisone B.P.C. in a water repellent silicone base is particularly indicated in the non-exudative stage of contact dermatitis and eczema.

It enables the anti-inflammatory healing action of hydrocortisone to proceed while protecting the lesions from the primary irritant.

'Cobadex'
TRADE MARK
OINTMENT

Hydrocortisone B.P.C., 1 per cent, in a water repellent base.

Basic N.H.S. price, tube of 10 grammes—10/-

Descriptive literature and specimen packings are available on request.

MEDICAL DEPT.

THE BRITISH DRUG HOUSES LTD. LONDON N.1

REGULATION OF BODY TEMPERATURE IN HEALTH AND DISEASE *

Sir GEORGE PICKERING
M.A., M.D. Cantab., F.R.C.P., Hon. F.A.C.P.
REGIUS PROFESSOR OF MEDICINE IN THE UNIVERSITY OF OXFORD

(*concluded from p. 9*)

MY first lecture was concerned with the mechanisms with which a healthy man regulates his body temperature. Now I wish to consider briefly the very low and very high temperatures which may be produced by breaking through this regulating mechanism, and to consider more fully the problem of fever which results from a disturbance in the regulating mechanism.

Hypothermia

It has been known for a long time (Boyle 1683) that fish may be imprisoned in ice, and may even become partly frozen, and yet recover when the temperature is raised. With the approach of winter some mammals (e.g., the marmot and the dormouse) retire to their burrows, curl up, and become drowsy; their body temperature falls to a little above that of their surroundings, and their heart-rates, respiration-rates, and metabolic rates fall to low levels. From warm-blooded they have changed to cold-blooded animals. The capacity to do this is widely distributed in mammals, being found in rodents (beavers), insectivores (hedgehogs), and carnivores (bears). It is rare in birds, but the "Poor Will" of the Western United States is said truly to hibernate (Fisher 1953).

Dr. Audrey Smith (1956) has shown that the hamster can be cooled to temperatures below freezing-point. When the temperature of the parietes falls to about −5°C, ice crystals form, the process of supercooling is arrested, and the temperature rises. As a consequence of the freezing of water, the electrolyte concentration of the remaining fluid rises; and, when it has doubled in the extracellular fluid, the cells are irreversibly damaged (Lovelock and Smith 1956). Even though superficial parts of the hamster form a shell of ice crystals, the animal may recover if it is gently warmed—e.g., by immersion in warm water—particularly if it has frozen progressively for not longer than 50 minutes; but less often if it has crystallised after supercooling below −3·5°C. The frozen animal has of course, no heart-beat and no respiration, and artificial respiration is required during warming.

Rats do not hibernate. Andjus (1951), however, showed that a small proportion of these animals cooled to between 0 and +2°C could also be reanimated after heart and breathing had stopped for 40–50 minutes, and improvement of technique brought about the survival of 75–100% of animals so cooled (Andjus and Smith 1955). The learning of rats so cooled and reanimated was definitely impaired when cooling had proceeded to between +1 and 0°C, but no impairment was demonstrated when the lowest temperature reached was between +13·4 and +18·5°C (Andjus et al. 1956).

The theoretical and practical importance of these observations needs no emphasis. Here in fact is a breaking through of the barrier between Bernard's "*la vie constante*" to "*la vie oscillante*" and even to "*la vie non-manifestée*". Moreover it is becoming increasingly evident that, at low temperatures, operations, particularly those involving heart, large blood-vessels, and brain, are possible that would have had disastrous results at normal temperature. A large literature has grown up on hypothermia or artificial hibernation in man, and I shall not attempt to review it here. I shall only make four points:

(1) The practical difficulty in cooling men is to break through the defences of the body; the most effective means is to give an anæsthetic, which (as we have seen) has been shown to interrupt at some point or points the reflex arcs which protect against cooling, particularly by shivering.

(2) Consciousness generally seems to be clouded or lost at rectal temperatures between 29 and 31°C.

(3) At temperatures below 30°C glucose is metabolised slowly or not at all (Wynn 1954).

(4) Finally and most important, the lethal temperature seems to be between 25 and 27°C, when ventricular fibrillation occurs. The exact mechanism by which ventricular fibrillation is precipitated in cold men is thus the outstanding practical problem, if the full possibilities of this line of treatment are to be developed.

Hyperthermia

It has also long been known that, in very hot weather, particularly after exposure to strong sun, men may become comatose and die. Medicine, in its omniscience, was of course at hand with an explanation, and this illness was attributed to the actinic rays of the sun striking through the back of the neck to the vital centres in the medulla. Hence the pith helmet and those cloths that draped the back of the helmet in India a century ago. It is known now that this illness is heatstroke, a breakdown of the regulating devices of the body with the result that the temperature rises usually above 106°F. I know of three good accounts, that of Lambert (1897) describing an epidemic in New York, that of Ferris et al. (1938) describing an outbreak in Cincinnati, and that of Ladell, Waterlow, and Hudson (1944) describing their experiences with British and Commonwealth troops in the Middle East.

Of the Cincinnati patients only seven were under 50 years old, and most were exposed to the highest temperatures—e.g., living in a top flat under a flat roof which got much heated by the sun. Absence of sweating was noted in all; most were in coma and incontinent of fæces. When they were treated with ice-water applied to the skin, there was a rapid fall of temperature, consciousness being regained about 106–107°C, when goose-skin was also frequently noted. The sodium-chloride level in the blood was normal. The cessation of sweating was noted to be a common precipitating factor in these cases, as it was in those of Ladell et al. (1944).

Lambert (1897) found in the New York epidemic that every patient with a temperature of 110°F or over was completely comatose. Of seventy-three patients admitted to hospital and subsequently traced, three were found to be insane.

These observations may be compared with those on therapeutic hyperthermia, at one time used to treat syphilis and gonorrhœa, described by many workers—e.g., Wallace and Bushby (1944). The aim of such treatment was to achieve a temperature of 106°F for 8 hours. Most of the patients became disorientated, and many showed herpes labialis on recovery. These are two of the striking features of lobar pneumonia, often attributed to that (to me mysterious) state "toxæmia" but apparently attributable simply to the effect of temperature. Arterial anoxia and bilirubinæmia were common. Lambert noted anæmia as a common sequel of sunstroke in the New York epidemic.

* The Croonian lectures for 1957, delivered on May 14 and May 16 before the Royal College of Physicians of London.

Fever

By far the most important of the disturbances of body temperature is fever, which may be defined as a raised central temperature consequent on a disturbance of the thermotaxic mechanism.

One cause of fever may be disposed of at once—namely, a lesion of the central nervous system, particularly of the basal ganglia. These lesions presumably destroy part of the central receptors or their connections. In view of the results of experiments on animals it is rather surprising that such lesions have never been observed to produce falls but only rises in body temperature. These rises are often extreme. Thus of Bryant's hundred cases of hyperpyrexia (over 106°F) twenty-two were due to brain lesions, and all those patients died. Little more can be learnt from such cases. The commonest lesion is cerebral hæmorrhage, which usually causes extensive disruption of the brain; the basal ganglia are generally involved, and rupture into the ventricles is common.

Causes

In the remaining, and much more numerous, instances, fever is the result of a functional disturbance of the thermotaxic mechanism. The commonest causes are (1) infections or infestations, and (2) lesions which destroy tissues.

Infecting agents include viruses (e.g., poliomyelitis), bacteria (e.g., pneumonia), protozoa (e.g., malaria), and fungi (e.g., actinomycosis). Even the nematode worms may be involved; invasion of the tissues by *Trichinella spiralis*, or of the lungs by ascaris, may produce fever, associated in each case with a large increase in the eosinophil cells of the blood. In the absence of infections, fever due to lesions causing tissue destruction is usually slight; such lesions are infarction (e.g., of the heart), malignant tumours (particularly when the growth is extensive or metastasising in liver), and gout.

Because of these two types of lesion causing it, the mechanism of fever has been sought in the chemical constituents of invading microorganisms, on the one hand, and of the body cells of the host on the other. Here we may note that fever has other causes whose nature is obscure. Thus rheumatic fever is currently conceived to represent an immune reaction between the antigens of a particular strain of streptococcus (Lancefield group A, B hæmolytic) and the antibodies of the host. Half a century ago this disease was a common cause of hyperpyrexia, comprising 6% of Bryant's cases, and being the commonest cause in the wards of Guy's Hospital after nervous lesions and pyæmia. Another curious instance is hæmorrhage; a rise of temperature up to 100 or 101°F is common after gastrointestinal bleeding.

Of these instances of naturally occurring fever, by far the most carefully investigated is malaria.

Characteristically, paroxysms of fever occur on the third day (every 48 hours) in benign and malignant tertian malaria (*Plasmodium vivax* and *falciparum*) or on the fourth day in the quartan form (*P. malariæ*). These intervals correspond to the times taken for the merozoites to invade the red cells, subdivide within them, and finally break through the red-cell envelope into the bloodstream. The onset of fever is thought to correspond approximately to the rupture of the red cells and the entry of the merozoites into the bloodstream.

Virchow (1854) conceived of fever as a weakness—a failure to control heart, blood-vessels, and metabolism through the moderating centre. Traube (1864) discovered that in fever the elimination of nitrogen is increased. He supposed that this was secondary to a circulatory disturbance; that a fever-producing agent produced, through the tonic vasomotor nerves, contraction of the peripheral arterioles, with a consequent decline in surface temperature and rise in deep temperature. Von Liebermeister (1875) developed Traube's hypothesis and concluded from his experiments that, in fever as in health, constancy of body temperature is ensured by the adaptation of heat production to discharge, and that in fever the body temperature is regulated in the same way as in health, except that the norm is higher. In general Von Liebermeister's concept of the nature of the disturbance that constitutes fever is widely accepted still. As we shall see, it explains many of the facts, but new data have become available that lie entirely outside his hypothesis. With this introduction we may look more closely at the established facts.

Three Phases

It is customary to divide a fever into three phases: (1) the phase of rising temperature, the chill or ague; (2) the phase of steady pyrexia, the fastigium or flush; and (3) the phase of falling temperature, the sweating phase or defervescence. The first and last phases are most easily studied in brief bouts of fever whose onset and duration are predictable. Such are malaria and the fever produced by injection of pyrogens.

It is clear from bedside observation that the rise of temperature during the *chill* is due both to decreased heat loss and to increased heat production. Thus, at the onset of the chill, the blood-vessels of the skin constrict and the surface temperature falls; the patient feels subjectively cold, goose-skin develops, and he begins to shiver. At this stage he will, if he can, retire to bed with a hot-water bottle and many blankets. In a patient with quotidian ague Sydney Ringer (1859) found that the temperature recorded in the axilla began to rise before there was a subjective sensation of cold. In fever produced by incubation of bacterial pyrogen with blood Gerbrandy, Cranston, and Snell (1954) found that a sharp vasoconstriction in the hand preceded the rise in mouth-temperature by about 3 minutes, the rectal temperature beginning to rise some 6 minutes later. That heat production is increased during the chill was first shown by Von Liebermeister (1875) and confirmed by Barr and DuBois (1918).

The *fastigium* is most easily studied in pneumonia or in typhoid where the temperature remains high for several successive days. It shows the same diurnal variations as in health, the peak being reached in the early evening and the trough in the early morning, but the fluctuations are usually larger. It is from this phase comes the chief evidence for Von Liebermeister's hypothesis:

Stern (1892) found that, when the body was immersed in a hot bath, sweating began after the same rise of temperature (0·1–0·8°C) in febrile as in normal people; conversely, immersion in a cool bath produced shivering after similar falls. Schwenkenbecher and Tuteur (1907) observed that food produced similar increases in water loss from the skin in normal people and in patients with typhoid. In continuous fever they observed that the water loss from the skin is increased. Cecil, Barr, and DuBois (1922) observed that in continuous fever both heat production and heat elimination are increased, the increase in heat production above the normal averaging about 13% of basal per 1°C rise in body temperature.

The *defervescence* or phase of fall of temperature is seen at its most striking in the crisis of pneumonia and in the sweating stage of the malarial attack. The patient feels

very hot; he flings off his bedclothes and begins to sweat profusely. Clearly the fall of temperature is due to the mobilisation of all the mechanisms that increase heat loss.

In general, these phenomena can be interpreted in terms of Von Liebermeister's hypothesis. If we assume that, in the first phase, the setting of the thermotaxic mechanism is raised, we should expect the events during this phase to resemble those produced by exposing a healthy person to cold. Again during the fastigium temperature is regulated at a new and high level, and the usual defences are mobilised against a deviation up or down. Finally, the defervescence would be ascribed to a reduction in the level at which the mechanism is set; the response of the body should mimic that produced by exposure to heat, as it does. Nevertheless the methods used to test the hypothesis in the past have been relatively crude, and it is to be hoped that an opportunity will be found to see whether the central and peripheral receptors behave quantitatively in fever as Snell and Cooper have found them to behave in health.

Most of the phenomena of fever can be explained on this hypothesis or the effect of the raised temperature itself. Thus a rise in heart-rate and respiratory rate is produced by heating the body—though the relatively slow pulse in typhoid and high respiratory rate in pneumonia are exceptions. Again, the increased metabolic rate, together with anorexia, may largely explain the increased excretion of nitrogen and the tendency to muscular wasting; though, as Wright (1950) has emphasised, the major defence reactions of the body also involve large syntheses of protein. However, one set of vascular responses is now known that cannot be so explained, and to that we may now devote our attention.

Responses Unrelated to Thermotaxis

These responses were discovered accidentally by Homer Smith and his colleagues during investigations on the behaviour of the kidney: a sample of inulin, which they were using to estimate the glomerular filtration-rate, proved to be pyrogenic, and they were surprised to find that it produced a pronounced increase in the apparent renal blood-flow. Further and detailed investigation showed that the initial phase of the febrile response, the chill, is accompanied by a rise of blood-pressure and a decrease in glomerular filtration-rate and in renal plasma-flow. The phase of sustained pyrexia is accompanied by a fall of arterial pressure and a slight rise in glomerular filtration-rate and a much larger increase in renal blood-flow (Goldring et al. 1941). The fall of arterial pressure is much greater in persons with high blood-pressure, as indeed is true with most responses (Pickering 1955). Now, the fall in arterial pressure and the renal vasodilatation are not due to the rise in body-temperature; nor are they an essential component in producing it, for they both occur after the injection of a bacterial pyrogen, even though the fever is prevented with amidopyrine. These vascular responses thus seem to represent another effect of bacterial pyrogens, distinct from their effect on the thermotaxic mechanism.

Pyrogens

It is now apposite to turn our attention to the problem of pyrogens—i.e., substances which produce fever on parenteral injection. These substances have been sought in many places and found in two—namely, in bacteria, and in polymorphonuclear leucocytes.

The history of the investigation of bacterial pyrogens is fully reviewed by Bennett and Beeson (1950). Intravenous injection of the dead bodies of most gram-negative bacteria produces fever. Contamination with bacterial debris is now recognised as the cause of water fever, of salt fever, and of sugar fever (i.e., of pyrexia following intravenous injection of these fluids); and, as Hort and Penfold (1912) showed, the contaminating agents are of such a size that they pass a filter candle but not the gelatin filter devised by Martin. Lüderitz and Westphal (1952) have identified the pyrogen of *Escherichia coli* as a lipopolysaccharide of high molecular weight and containing 74% of phosphorylated polysaccharide and 26% of lipoid. The sugars obtained by hydrolysis of the polysaccharide include rhamnose, xylose, glucose, galactose, and *N*-acetyl hexosamine. 0·1 μg. of this substance injected intravenously is enough to produce fever in man. Like other bacterial pyrogens, this substance is not dialysable; it is not destroyed by boiling or autoclaving but is destroyed by dry heat at 160°C.

Oddly enough, no pyrogens have yet been found in gram-positive cocci. Thus, the bodies of dead pneumococci injected intravenously produce no fever (Bennett 1956c), despite the fact that the fever accompanying pneumococcal infection is one of the most intense encountered in man.

Because, as we have seen, mild or moderate fever is a common accompaniment of tissue destruction in man, several workers have sought pyrogens in tissue extracts. One of the first to report success was Menkin (1945), who showed that extracts of pus were pyrogenic, and named the active substance "pyrexin". However, the sample which Bennett and Beeson (1953b) investigated behaved more like a bacterial pyrogen, and the exact status of pyrexin remains uncertain.

The most thorough of such investigations is that of Bennett and Beeson (1953a), who, taking great care to avoid bacterial contamination, made saline extracts of various tissues in the rabbit, and found only one tissue that produced fever—namely the polymorphonuclear leucocytes. These they obtained from the buffy coat of the blood and from the peritoneal exudate induced by injecting physiological saline solution four hours previously. The pyrogenic agent found in leucocytes is quite different from that found in bacteria. Like that, it is not dialysable, but it is destroyed by boiling, but not by trypsin, chymotrypsin, or ribonuclease (Bennett and Beeson 1953b).

Again, oddly enough, no pyrogen has yet been obtained from human leucocytes. Cranston, Goodale, and Wendt, working in my laboratory, have not yet been able to produce fever with extracts of human leucocytes made by shaking them with glass beads, by freezing and thawing them, or by lysing them with water.

Mechanism by which Bacterial Pyrogens Produce Fever

When a bacterial pyrogen is injected intravenously into an animal, fever does not begin at once but only after a latent period of about quarter of an hour in the rabbit and 50 minutes in man. This, together with the fact that fever is known to occur in man in the absence of bacterial infection, led to search for a common factor, such as an intermediate substance produced by the interaction of bacterial pyrogens on the tissues of the body. Menkin's work has been noted. Beeson (1947) observed that, after large doses of bacterial pyrogen, little trace of any pyrogen was found in blood removed 8–10 minutes later; at 4–6

minutes pyrogenic activity was always considerable. Farr and LeQuire (1950) and LeQuire (1951) agreed but found that, when typhoid vaccine was incubated with citrated plasma before injection, the fever produced by its intravenous injection into recipient rabbits was hastened and augmented compared with that produced by incubating the pyrogen with saline solution. They attributed the effect to aggregation of the vaccine, which protected it from removal by the reticulo-endothelial system. Such are the observations from which the new developments in our understanding of fever stem.

Before describing these experiments it is necessary to explain the difference between the tolerance and the immunity which occur after repeated injections of pyrogen. If a given dose of pyrogen is injected daily, the amount of the fever (measured by the area of the curve of raised temperature) gradually lessens and after about a week or 10 days becomes small and thereafter remains unchanged. The animal is said to be tolerant. Left alone for 3 weeks and then reinjected, the animal gives a response which is equal in size to its original response. The tolerance has disappeared.

Now, pyrogens are chemically rather like antibodies: polysaccharides are major constituents of both of them. Tolerance is not, however, due to the formation of specific immune antibodies, for the following reasons: (1) its rate of development during injection and its persistence after injection are not parallel to the amount of immune antibodies in the blood; and (2) it is not specific: an animal that has become tolerant to a bacterial pyrogen derived from one species gives a reduced response to pyrogen derived from a related, but not identical, organism.

With this digression we may return to our main theme. The story has been developed by investigations in the rabbit and in man; and, since the facts elucidated differ materially in the two species, it will be necessary to treat them separately.

Effect of Pyrogens in Rabbits

Using pyrogen derived from *Proteus vulgaris*, Grant and Whalen (1953) found that fever after intravenous injection began earlier (12 minutes) after large doses (5 μg. upwards) than after smaller doses (26 minutes for 1 μg.). These responses had an early peak and a later peak. When large doses (100 μg.) were injected intravenously, citrated blood withdrawn during the subsequent 3 hours was also pyrogenic when blood was withdrawn 60-180 minutes after injection, the febrile response was hastened and the secondary peak tended to be smaller or absent. Grant and Whalen also showed that incubation of the pyrogen with citrated or heparinised plasma before injection diminished the latency of the ensuing fever. They attributed these effects to the interaction between bacterial pyrogen and plasma, leading to the formation of a new and more rapidly acting endogenous pyrogen. Grant (1953) showed that this capacity to form endogenous pyrogen is lost in the tolerant animal. Thus incubation of pyrogen with plasma from normal animals produces an augmented and quickened response in tolerant recipients. On the other hand, incubation of pyrogen with plasma from tolerant animals neither accelerates nor augments the response in tolerant recipients.

These results have been confirmed and amplified by Atkins and Wood (1955).

They investigated the responses to typhoid vaccine in three groups of rabbits:

(1) *Unsensitised* animals that had received no previous injection.

(2) *Sensitised* animals that had received one or two previous injections at intervals of not less than three weeks, with three to five weeks elapsing before the final test.

(3) *Tolerant* animals injected intravenously daily for 7–8 days and tested within 24 hours of the last injection.

Blood was withdrawn by cardiac puncture 5, 30, 60, and 120 minutes after intravenous injection of the vaccine and allowed to clot; 50–60 ml. of serum warmed to 37°C was injected intravenously to recipient rabbits next day. In the blood of the *unsensitised rabbits* the resulting fever indices (the areas enclosed by the curves of raised temperature) fell to half their initial value at 30 minutes and thereafter remained unchanged. In the *sensitised* rabbits the initial (5 minutes) value was less than half that of controls, and all pyrogenic activity had gone at 30 minutes, thereafter reappearing, the value at 90 minutes being similar to that at 5 minutes. The blood of *tolerant* rabbits showed no significant activity at any time.

As Grant and Whalen (1953) had found, the blood withdrawn at 120 minutes produced a more rapid response than that withdrawn at 5 minutes. Atkins and Wood (1955) think that some of this secondary pyrogen may come from injured leucocytes, firstly because bacterial pyrogen produces a leucopenia which precedes the fever, and secondly because Braude et al. (1955) have shown that a large part of injected *Esch. coli* endotoxin quickly enters the buffy coat. Atkins et al. (1955) have also found that cortisone 50 mg. daily suppresses fever but not leucopenia following the injection of typhoid vaccine; the serum of such rabbits contains as much transferable pyrogenic activity as that of rabbits untreated with cortisone. Cortisone thus does not affect the action of pyrogen on blood but its later effect on the fever-producing process.

These studies, and particularly those of Grant (1953), suggest that in the rabbit bacterial pyrogen produces in the blood-stream a secondary or endogenous pyrogen with a quicker action, and that plasma is the chief reactor with this bacterial substance.

Another approach to the problem of fever in the rabbit has been that of Bennett and Beeson (1953a and b). As has been mentioned, these workers only obtained febrile responses from saline extracts of one normal tissue—namely, polymorphonuclear leucocytes. The active material is thermolabile and non-dialysable; it produces no leucopenia or leucocytosis and exhibits no tolerance or cross-tolerance. They suggest that this constituent of normal leucocytes may be the intermediate agent between bacterial infection and fever.

However, some peculiar facts have not so far been fully explained:

(1) The most convenient way of obtaining leucocytes is to inject physiological saline solution into the peritoneal cavity. Both the leucocytes and the fluid in which they are suspended are pyrogenic: yet the rabbits whence they are drawn have no fever. As, in such animals, the thoracic-duct lymph and circulating blood contain no demonstrable pyrogenic activity (Bennett 1956b), it is concluded that the pyrogenic substance is not absorbed from the peritoneum.

(2) Rabbits in which circulating granulocytes have been abolished by previous treatment with nitrogen mustard respond in the usual way with fever to injections of bacterial pyrogen, influenza virus, and various particulate materials. In addition sterile peritoneal exudates produced by injection of physiological saline are pyrogenic even though they contain no leucocytes (Bennett and Beeson 1953b). It therefore seems that there may be a source other than leucocytes for pyrogenic substances, though Bennett (1956a) failed to find it by extracting tissues of leucopenic animals.

(3) Injection of pneumococci into the peritoneal cavity produces high fever, yet intravenous or intraperitoneal injection of dead pneumococci produces none. Like the sterile exudate, the peritoneal fluid induced by live pneumococci yields

NUMBER OF CASES

pyrogenic activity both in its polymorphs and in the fluid in which they lie. In these animals, unlike those with sterile exudates, pyrogenic activity is present in thoracic-duct lymph; none was demonstrable, however, in the circulating blood. It is therefore suggested that the fever produced by pneumococcal infection is due to the release from leucocytes of their pyrogenic material and its absorption into the blood-stream (Bennett 1956c).

Armin and Grant (1957) have shown that, after the intravenous injection of an *Esch. coli* vaccine, the denervated ear of the rabbit shows two phases of constriction—one at about 5 minutes, and the other at about an hour, after the injection. The first is probably due to the release of a histamine-like substance, and the second to release of substances like adrenaline and 5-hydroxytryptamine. It is interesting that the delayed release occurs at a time when the normal ear (which is less sensitive to chemical stimuli) is vasodilated through nervous action.

Effect of Pyrogens in Man

The first investigation of the initial process in the action of bacterial pyrogens in man was that of Gerbrandy, Cranston, and Snell (1954). Using both a killed *Esch. coli* preparation ('Pyrifer') and a polysaccharide fraction obtained from pseudomonas ('Piromen'), they found that intravenous injection in normal subjects produced a fall of heat elimination from the hand, a rise in mouth temperature, and a rise in rectal temperature, after latent periods of 76·2, 71·1, and 73·5 minutes respectively (fig. 6). When the same dose of pyrogen was incubated for $2^1/_2$–$3^1/_2$ hours at 37°C in 17–250 ml. of the person's own blood, the latent periods of the responses were 16·5, 19·2, and 25·5 minutes respectively.

These are large differences, about 50–60 minutes, and it seems even clearer in man than it was in the rabbit that the initial process in the action of a bacterial pyrogen is with a component of the blood. Cranston, Goodale, Snell, and Wendt (1956) have shown that the tissue component is probably the polymorphonuclear leucocyte. Unlike that of the rabbit, human plasma or serum incubated with bacterial pyrogen neither accelerates nor augments the fever that ensues after its injection. In fact both serum and plasma reduce the febrile response, the effect being destroyed by previously heating serum to 56°C for 30 minutes (Goodale et al. 1956). This effect may perhaps be correlated with the evidence of Rowley et al. (1956) that normal serum splits bacterial polysaccharide, an effect likewise inhibited by previously heating the serum to 56°C.

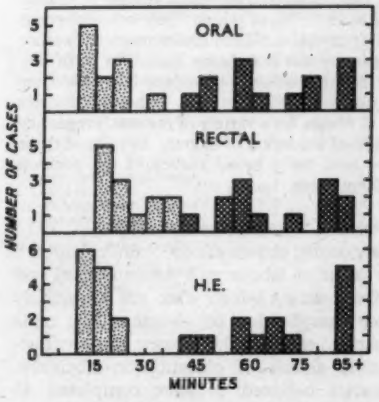


Fig. 6—Latent periods between injections of pyrogen and changes in oral and rectal temperature and in elimination of heat from hand (H.E.: stippled, pyrogen incubated in fresh blood; hatched, control injections of pyrogen. Gerbrandy et al. (1954).

If, on the other hand, pyrogen is incubated with the cellular fraction of the blood and then injected, the fever is of rapid onset. By using fractions containing different proportions of red cells, white cells, and platelets, Cranston et al. (1956) show that there is a clear correlation between the incidence of fever of rapid onset and the number of white cells in the preparation, but none with the numbers of red cells or of platelets.

If bacterial pyrogen is incubated with a preparation of white cells suspended in saline solution, the rapidly acting pyrogenic substance is found in the supernatant fluid after spinning off the cells. Its chemical properties can thus be investigated. It has been shown that it does not dialyse, that it is precipitated by saturation with ammonium sulphate, and that it is destroyed by heating to 70°C for 30 minutes. The properties of this endogenous pyrogen are thus in a broad way similar to those of the pyrogen obtained by Bennett and Beeson (1953a and b) from the normal leucocytes of the rabbit. It is more likely to be derived from the leucocytes (by the action on them of bacterial pyrogen) than to be derived from the bacterial pyrogen itself. On the other hand, if this view is correct, incubation with pyrogen should produce some morphological change in the white cells; but no such change has yet been observed, nor are the white cells destroyed. Again, one would expect that a similar substance might be liberated when white cells are lysed; but this has not been demonstrated.

Discussion

The evidence now seems strong that, sometimes at least, fever in man is due to the release of a substance ("endogenous pyrogen") from leucocytes, through the action of bacterial pyrogens on them. In the rabbit the tissue reactant seems to be found in plasma or serum. In the rabbit pyrogenic substance can be extracted from normal leucocytes and seems to have properties similar to those of the endogenous pyrogen released from human white cells by bacterial pyrogen. As yet no similar substance has been extracted from normal human white cells.

The phenomenon of tolerance suggests that, in man and the rabbit, the formation of endogenous pyrogen is a necessary intermediate step between bacterial pyrogen and fever. It is tempting to suppose that such an intermediate step is always necessary, but much work remains to be done before such a proposition can be either affirmed or denied. The endogenous pyrogen most probably acts on certain cells in the central nervous system, modifying their behaviour in such a way that the effect of cold on the peripheral and central receptors is mimicked. It may act on the vessels of the kidney, producing the peculiar changes already discussed; but this again is to go beyond the evidence.

The considerable interval between the entry of endogenous pyrogen into the blood-stream and the onset of fever suggests the formation of a further intermediate substance. The latent period may, however, represent the time taken for the endogenous pyrogen to pass from the blood plasma to the site of action in the cell; for its chemical properties indicate that it is a large molecule, and it may have a fair distance to travel.

* * *

The function of hypothesis is to stimulate experiment, and these remarks are chiefly justified in that sense. It must be clear to the reader that the problem of fever, hitherto so resistant to scientific inquiry, is now beginning

to yield its secrets. These lectures are in fact no more than an overture. The body of the work is to come.

In conclusion I should like to say that, though it has been my privilege to deliver these lectures, I have to some extent acted as mouthpiece for the men actually doing the work. I want therefore to end by acknowledging the help I have received from Dr. K. E. Cooper, Dr. W. I. Cranston, and Dr. E. S. Snell, of my staff at St. Mary's Hospital and at Oxford, and from Dr. J. Gerbrandy, Dr. F. Goodale, and Dr. F. Wendt, who were visiting workers in my department.

REFERENCES

Andjus, R. K. (1951) *C.R. Acad. Sci., Paris*, **232**, 1591.
— Knopfelmacher, F., Russell, R. W., Smith, A. U. (1956) *Quart. J. exp. Psych.* **8**, 15.
— Smith, A.-U. (1955) *J. Physiol.* **128**, 446.
Atkins, E., Allison, F., jr., Smith, M. R., Wood, W. B., jr. (1955) *J. exp. Med.* **101**, 353.
— Wood, W. B., jr. (1955) *ibid.* p. 519.
Barr, D. P., DuBois, E. F. (1918) *Arch. intern. Med.* **21**, 627.
Beeson, P. B. (1947) *J. exp. Med.* **86**, 39.
Bennett, I. L., jr. (1956a) *Bull. Johns Hopk. Hosp.* **98**, 1.
— (1956b) *ibid.* p. 7.
— (1956c) *ibid.* p. 216.
— Beeson, P. B. (1950) *Medicine, Baltimore*, **29**, 365.
— — (1953a) *J. exp. Med.* **98**, 477.
— — (1953b) *ibid.* p. 493.
Boyle, R. (1683) New Experiments and Observations Touching Cold. Oxford.
Braude, A. I., Carey, F. J., Zalesky, M. (1955) *J. clin. Invest.* **34**, 858.
Bryant, J. H. (1897) *Guy's Hosp. Rep.* **4**, June and July.
Cecil, R. L., Barr, D. P., DuBois, E. F. (1922) *Arch. intern. Med.* **29**, 583.
Cranston, W. I., Goodale, F., jr., Snell, E. S., Wendt, F. (1956) *Clin. Sci.* **15**, 219.
Farr, R. S., LeQuire, V. S. (1950) *Proc. Soc. exp. Biol., N.Y.* **75**, 661.
Ferris, E. B., jr., Blankenhorn, M. A., Robinson, H. W., Cullen, G. E. (1938) *J. clin. Invest.* **17**, 249.
Fisher, J. (1953) Watching Birds. London.
Gerbrandy, J., Cranston, W. I., Snell, E. S. (1954) *Clin. Sci.* **13**, 453.
Goldring, W., Chasis, H., Ranges, H. A., Smith, H. W. (1941) *J. clin. Invest.* **20**, 637.
Goodale, F. jun., Snell, E. S., Wendt, F., Cranston, W. I. (1956) *Clin. Sci.* **15**, 491.
Grant, R. (1953) *Amer. J. Physiol.* **173**, 246.
— Whalen, W. J. (1953) *ibid.* p. 47.
Hort, E. C., Penfold, W. J. (1912) *Proc. roy. Soc. B*, **85**, 174.
Ladell, W. S. S., Waterlow, J. C., Hudson, M. F. (1944) *Lancet*, ii, 491, 527.
Lambert, A. (1897) *Med. News*, **71**, 97.
LeQuire, V. S. (1951) *J. infect. Dis.* **88**, 194.
Lovelock, J. E., Smith, A. U. (1956) *Proc. roy. Soc.* B, **145**, 427.
Lüderitz, O. Westphal, O. (1952) *Z. Naturf.* 7b, 548.
Menkin, V. (1945) *Arch. Path.* **39**, 28.
Pickering, G. W. (1955) High Blood Pressure. London.
Ringer, S. (1859) *Medico-Chirurg. Trans.* **42**, 361.
Rowley, D., Howard, J. G., Jenkin, C. R. (1956) *Lancet*, i, 366.
Schwenkenbecher, Tuteur, (1907) *Arch. exp. Path. Pharm.* **57**, 284.
Smith, A. V. (1956) *Proc. roy. Soc.* B, **145**, 391, 407.
Stern, R. (1892) *Z. klin. Med.* **20**, 63.
Traube, L. (1864) Zur Fieberlehre Gesammelte Beiträge; vol. ii, p. 697.
Virchow, R. (1854) Handbuch der Speciellen Pathologie und Therapie; vol. i. Stuttgart.
Von Liebermeister, C. (1875) Handbuch der Pathologie und Therapie des Fiebers. Leipzig.
Wallace, J., Bushby, S. R. M. (1944) *Lancet*, ii, 459.
Wright, G. P. (1950) An Introduction to Pathology. London.
Wynn, V. (1954) *Lancet*, ii, 575.

THE CHOICE BETWEEN DEATH FROM POSTMATURITY AND DEATH FROM INDUCTION OF LABOUR

G. F. GIBBERD

M.S. Lond., F.R.C.S., F.R.C.O.G.

OBSTETRIC SURGEON, GUY'S HOSPITAL, AND QUEEN CHARLOTTE'S MATERNITY HOSPITAL, LONDON, W.6

IF postmaturity is indeed a cause of loss of infant life it must presumably act through placental insufficiency causing anoxia. The ill effects of anoxia could be manifest in three different ways:

(1) *Prenatal death.*—If the anoxia of postmaturity caused death of the fœtus before the onset of labour, the clinical course would be that of the birth of a macerated fœtus some time later, without the discovery of any gross abnormality in mother or fœtus which might otherwise account for the death. Thus, if we take a group containing all the cases of macerated fœtus in which there was no maternal disease—e.g., toxæmia and diabetes—nor any fœtal abnormality—e.g., retroplacental hæmatoma and hydrops fœtalis—we shall have a group which will contain all the antepartum deaths due to the anoxia of placental insufficiency. The group will also contain some cases in which other unknown factors may be responsible, but we can at least be sure that the deaths due to postmaturity itself cannot be more numerous (indeed they are almost certainly less numerous) than these "unexplained" deaths indicate.

(2) *Intranatal death.*—The anoxia due to placental insufficiency might conceivably be of an order that did not kill the fœtus until the anoxia of labour was added. In such a case the fœtus might die during labour, and necropsy would not reveal any abnormality apart from the signs of asphyxia; nor would a review of the clinical course of labour show any mechanical accident to account for the fatal anoxia. Thus, if we take a group of fresh stillbirths in which there is neither a fœtal abnormality such as intracranial hæmorrhage, nor any complication of labour such as prolapse of the umbilical cord, we shall have a group which will contain all those cases of placental insufficiency in which a fatal intranatal anoxia developed. This group will also contain some cases in which unknown factors may have been responsible, but the inflation of the estimate of risk from postmaturity itself is likely to be less than in the prenatal group, because our knowledge of the causes of intranatal asphyxia is less incomplete than that of the causes of prenatal asphyxia.

(3) *Postnatal death.*—The anoxia due to placental insufficiency might be even less than in the former group and cause only a severe intranatal asphyxia, with the result that the infant is born alive in a more or less drowned state of "asphyxia neonatorum", only to die within a few minutes or days because of non-aeration of its lungs. Thus a group of infants who die in the first few days, and in whom necropsy reveals no gross abnormality apart from airless or nearly airless lungs, will be a group which contains all the infant deaths that can reasonably be attributed to the anoxia of placental insufficiency.

Incidence of Deaths due to Anoxia

We are now in a position to consider the proportion of patients delivered at each week of gestation and to examine in each group the three manifestations of anoxic death due to placental insufficiency. Since we are here concerned with the dangers of postmaturity only, the details of patients delivered before the 37th week have not been considered.

The figures in table I set out the numbers of cases delivered at each week in the two months near term. They are obtained from the records of 8503 deliveries of viable infants at Queen Charlotte's Hospital in 1951–53, of which 7965 were delivered after the 36th week of gestation. They are incomplete because the duration of pregnancy was not always known or recorded. They represent the mixed practice of a hospital in which there was not any fixed policy about treatment. They necessarily include many cases in which, for a variety of reasons, pregnancy was cut short by artificial induction of labour. In spite of these failings they can be used for a broad survey of the position as it was in those three years.

Estimation of Danger from Anoxia

In table I the only deaths shown are the "unexplained" deaths before the onset of labour and the intranatal and postnatal deaths from anoxia which were not adequately explained by gross complication or disease. The table can therefore be used to estimate the greatest loss attributable to the possible anoxia of placental insufficiency. Thus, in pregnancies believed to have completed 41 weeks or more, not more than 1·1% of infants can have been lost because of the postmaturity itself.*

* A similar but not identical analysis of cases (Gibberd 1952) led to the conclusion that 1·6% represented the greatest possible estimate of loss of infant life attributable to postmaturity.

It must be emphasised, however, that anoxia is a danger that attends every fœtus irrespective of its maturity, and the corresponding figures for pregnancies that have completed 37, 38, 39, or 40 weeks are 2·6, 2·4, 0·4, and 0·6 respectively. Many possible (though obscure) factors contribute to anoxia in the fœtus, and these factors may be unequally distributed at different periods of gestation; hence it might be misleading to draw more than the broadest conclusions from these figures. In general terms, however, the 0·85% fœtal loss from anoxia when labour takes place in the month preceding the 41st week can be compared with the 1·1% loss from anoxia when labour takes place in the month after the 41st week—a difference of 0·25%. If we compare the postmature group with the more limited group of patients who are delivered at 39 and 40 weeks, the difference is 0·6%.

Thus, if we were in possession of an infallible and entirely safe method of induction of labour and were to use it in every case immediately before pregnancy had completed its 41st week, we ought not to expect our policy of routine induction of labour on the 286th day after the last menstrual period to save more than 6 babies in every 1000 inductions. That is the best we might reasonably hope for with a perfect method of induction.

Results of Routine Induction

The expected results from the routine use of an ideal method of induction at various stages of postmaturity can be calculated from table I:

If it had been decided to terminate every pregnancy immediately before the 41st week had been completed, 2648 cases would have been subjected to induction; and, if induction had been invariably successful and completely safe, all the patients would have been delivered at 40 weeks, with an expected fœtal and infant loss of 0·6%—i.e., 16 infants would have been lost (compared with 30 infants who died in the 41–44 week group; this would represent a saving of 14 infants).

Similarly, if labour had been induced immediately before the 42nd week had been completed, 1219 inductions would have been done, with an expected loss of 0·4%—i.e., 5 infants would have been lost (compared with 24 infants who died in the 42–44 week group; this would represent a saving of 19 infants).

TABLE I—INCIDENCE OF DEATHS DUE TO ANOXIA

Completed weeks since last menstruation	37	38	39	40	41	42	43	44 or more
Number of births	269	587	1215	3246	1429	816	288	115
			5317				403	
							1219	
							2648	
Percentage of total viable births (8534)	3·1	6·8	14	38	17	9·5	3·4	1·36
(*a*) Prenatal death without gross abnormality	3	11	3	7	4	7	4	3
(*b*) Intranatal asphyxial death without other abnormality	3	1	2	6	2	2	3	1
(*c*) Postnatal asphyxial death without other abnormality	1	2		6		2	1	1
Total loss of infant life attributed to anoxia (*a*+*b*+*c*)	7	14	5	19	6	11	8	5
							13	
							24	
							30	
Mortality per 100 births	2·6	2·4	0·4	0·6	0·4	1·3	2·8	4·3
			0·5			1·1		
		0·85						

TABLE II—INDUCTION OF LABOUR BY ARTIFICIAL RUPTURE OF MEMBRANES FOR POSTMATURITY WITHOUT OTHER ABNORMALITY

Completed weeks of pregnancy	41	42	43	44 or more	Total
No. of inductions	2	26	23	17	68
No. of cæsarean sections after failure of induction		1		3	4
No. of stillbirths (all due to intranatal asphyxia)	1		3		4

If the end of the 43rd week had been the signal for interference, 403 inductions would have been done with a loss (at 1·3%) of 5 infants (compared with 13 infants who died in the 43–44 week group; this would represent a saving of 5 infants).

If interference had been postponed until immediately before the 44th week had been completed, there would have been 115 inductions with a loss (at 2·8%) of 3 infants (compared with 5 infants who died in the 44+ week group; this would represent a saving of 2 infants).

At the best we might have saved 19 infants with 1219 inductions, or 2 infants with 115 inductions. This calculation assumes a method of induction of labour which is infallible and is itself entirely free from risk to the fœtus. But does such a method exist?

Despite the happy results, published from some centres, following the widespread use of artificial rupture of the membranes, there is still a considerable number of obstetricians whose patients are not invariably lucky when this method is used. The introduction by Theobald (Theobald et al. 1948) of the method of inducing labour by continuously controlled injections of very small doses of posterior-pituitary extract was a great contribution to the technique of induction, and has led to extensive use of his method either as a primary procedure or as a supplement in those cases in which artificial rupture of the membranes has failed; but here again not everyone has found the use of pituitrin by this method to be invariably successful or invariably safe for the fœtus.

In postmature pregnancies in this series it is unfortunately impossible to give a figure for the number of cases in which so-called medical induction was done either successfully or unsuccessfully. Induction of labour by the oxytocin-drip method was not used often enough or consistently enough to enable useful conclusions to be drawn. Table II, however, shows the results of surgical induction of labour in which the sole indication for the artificial rupture of the membranes was uncomplicated postmaturity. There were 4 stillbirths.

The details of the stillbirths are as follows:

Case 1.—Primigravida, aged 35. Membranes were artificially ruptured at the 43rd week for postmaturity. Labour did not begin until seven days later, and shortly after this the fœtal heart ceased to beat. Forceps delivery after 44 hours' labour produced a fœtus showing signs of early maceration but no other abnormality.

Case 2.—Primigravida, aged 30. Membranes were artificially ruptured at the 41st week for postmaturity. Irregular contractions of the uterus started after 24 hours, but the fœtal heart ceased to beat 40 hours after the membranes had been ruptured. Spontaneous delivery of a stillborn fœtus after 56 hours' labour. Apart from signs of asphyxia there was no gross abnormality in the fœtus.

Case 3.—Primigravida, aged 26. Membranes were artificially ruptured at the 43rd week for postmaturity. Irregular uterine contractions occurred during the next two days, but the fœtal heart ceased to beat 48 hours after the membranes had been ruptured. A stillborn fœtus showing signs of early maceration but no other abnormality was delivered spontaneously 69 hours after the membranes had been ruptured.

Case 4.—Primigravida, aged 35. Membranes were artificially ruptured at the 43rd week for postmaturity. Irregular uterine contractions started after 32 hours. The fœtal heart ceased to beat 57 hours after rupture of the membranes. Irregular contractions

continued with intervals of complete inertia, and the patient was finally delivered spontaneously of a macerated fœtus 110 hours after the membranes had been ruptured. No gross abnormality was found in the fœtus.

The 4 stillbirths in this series illustrate only too clearly one of the dangers of artificial rupture of the membranes as a method of induction of labour. Labour failed to start for many hours or days, and then only with irregular and ineffective contractions. During all this time the fœtus, perhaps already near the limit of its placental reserve, was subjected to an added measure of anoxia over a long period by the uterine retraction which followed the escape of the liquor amnii. It is impossible to know what degree of anoxia was present before the interference was undertaken, or what degree of anoxia was due to the induction. It seems likely, however, that it is just in those cases where oxygenation of the fœtal blood is becoming dangerously low that the risk of death from the added anoxia of the induction is so much the greater.

If one can be wise after the event, it may be said that, in these four fatal cases, cæsarean section ought to have been done before the fœtus died when the course of labour proved to be so slow. In this series of 68 inductions cæsarean section was done on 4 occasions for this very reason. The difficulty is always to know in which case, and exactly when, to do this. If caution were not exercised, it might be found, too often, that cæsarean section was done for failed induction rather than induction of labour for postmaturity.

To say that 4 stillbirths in 68 surgical inductions of labour represents a fœtal mortality of nearly 6% may or may not be significant in the statistical sense of the word; but the figures certainly do not provide any basis for advocating the routine use of artificial rupture of the membranes in an attempt to avoid the dangers of postmaturity. They ought, at least, to remind us that surgical induction of labour is not invariably successful; nor is it always safe for the fœtus.

Attempts to induce labour with castor oil and enemata too often fail. Although a failed "medical induction" is sometimes regarded as entirely harmless, it is often disappointing. The moral effect of failure on the patient and her attendant may not always be without remote repercussions on subsequent events. Inertia during labour is closely bound up with demoralisation of the patient or her obstetrician. Induction of labour by the oxytocin-drip method has had many strong advocates, but among the patients here reported it was not used often enough to enable conclusions to be drawn.

Conclusion

An attempt has been made to estimate the saving of infant life that could be achieved by preventing postmaturity. Instead of considering gross fœtal and infant mortality-rates, the estimate of risk due to postmaturity has been based upon the incidence of fœtal and neonatal death from anoxia in circumstances which do not allow of any clear alternative explanation for the fatality. On this basis it is possible to estimate the maximum possible loss of life that can be attributed to the postmaturity itself.

In all the cases in which pregnancy passes the 41st week the loss directly due to postmaturity is less than 1·2%—possibly considerably less. It probably varies from something less than 0·4% between the 41st and 42nd weeks to something less than 4·3% after the 44th week has been passed. In a midwifery practice with about 8500 viable births a perfect method of induction of labour used on 2600 occasions immediately before the 41st week of pregnancy was completed could not save more than 14 infant lives. Used on 115 occasions immediately before the 44th week was completed it could not save more than 2 infant lives.

An appreciation of these figures is important before we are justified in advocating the routine avoidance of postmaturity by induction of labour with an imperfect method. There is reason to believe that, in postmaturity, artificial rupture of the membranes carries with it dangers to the fœtus that are considerably greater than those which the interference is designed to circumvent. The statistical studies that have come from Professor Baird's department in Aberdeen, and in particular the observations of Walker and Turnbull (1953) on fœtal blood-oxygen content, have focused the attention of all practicing obstetricians on the dangers of postmaturity.

We must accept that postmaturity carries an increased risk to the fœtus, but this is not necessarily a good reason for forcing the fœtus out of frying-pan of postmaturity into the fire of induction of labour. For those who think they have found a safe and effective method of induction there is not any problem. For those who are impressed by the fallibility and the dangers of all the present-known methods of induction the management of postmaturity will remain a difficult problem. Appreciation of the dangers of postmaturity is essential, but that must not overshadow an understanding of the dangers of induction.

In the presence of other complicating factors the management of postmaturity calls for the fullest individual consideration, for all the niceties of judgment, and often also for finesse in treatment. In uncomplicated cases, with our present imperfect methods of induction of labour, it is probably better to avoid the treatment of postmaturity altogether rather than to embark on a rigid policy of prevention.

I wish to thank my colleagues at Queen Charlotte's Hospital for allowing me to make use of the clinical records of their cases.

REFERENCES

Gibberd, G. F. (1952) *N.Z. med. J.* **51**, 277.
Theobald, G. W., Graham, A., Campbell, J., Gange, P. D., Driscoll, W. J. (1948) *Brit. med. J.* ii, 123.
Walker, J., Turnbull, E. P. N. (1953) *Lancet*, ii, 312.

THE CHECK-VALVE MECHANISM AND THE MEANING OF EMPHYSEMA

W. A. LISTER
T.D., M.D. Cantab., F.R.C.P.
PHYSICIAN, SOUTH DEVON AND EAST CORNWALL HOSPITAL, PLYMOUTH

"We are therefore within sight of a rational concept of emphysema reasonably secure in its physiological support, but somewhat tentative in the links between structural and functional change." Arnott (1956).

This paper is written with the object of trying to strengthen these links.

* * *

Chevalier Jackson (1930) gives a very clear account of bronchial obstruction in all its variations and the several effects that these produce. He classifies obstructions into:

1. Complete blockage (corking), which leads to collapse of the lung beyond the block as the trapped air is absorbed.

2. Partial blockage, which simply causes wheezing as the air passes through the constriction.

3. Ball-valve obstruction, which blocks inspiration but allows air to pass out during expiration. This leads to collapse and atelectasis even more quickly than "corking".

4. Check-valve obstruction, which allows air to be drawn in during inspiration but prevents it from passing out during expiration. This leads to distension or emphysema of the lung beyond the valve.

An obstruction situated on the junction of two bronchi may act as a ball valve in one and a check valve in the other, and so give rise to atelectasis and emphysema in two adjacent segments of lung. Jackson's paper is based on observations with a bronchoscope. He saw these effects produced by obstructions of several kinds: foreign bodies, of which peanuts formed the majority; tumours, both benign and malignant; local swelling of the mucous membrane; and plugs of viscid mucus. I am here primarily concerned with the check valve, but the other types of bronchial obstruction and their effects should not be forgotten.

* * *

The simplest and most dramatic results of check-valve action are seen in the so-called balloon cysts, which may fill half the thoracic cavity and resemble tension pneumothorax. None of those who describe them question their method of production. On no other basis can one explain how they quickly fill up again with air under considerable positive pressure after aspiration, and at necropsy it has sometimes been possible to demonstrate their communication with a tiny bronchus (Koontz 1925, Miller 1926, Pearson 1930, Parmelee and Apfelbach 1931, Anspach and Wolman 1933, Miller 1933, Sellors 1938, Kaltreider and Fray 1939, Brown and Brock 1942). There can be no doubt, therefore, that check-valve action is a very potent mechanism in inflating terminal air sacs beyond their natural size. Smaller cysts, single or in groups, may result from the same mechanism in a variety of other pathological states. Examples are recorded under a number of different names—air cysts, caverns, blebs, bullæ, and focal emphysema—and as being associated with tuberculosis, pneumoconiosis, and staphylococcal pneumonia. Asthma is often present as well.

From whatever cause they arise and whatever the size or distribution of the cavities, the physiological effects as judged by analyses of blood and air are the same in all and similar to those found in "obstructive" pulmonary emphysema (Christie 1934, Hundato and Fray 1934, Kaltreider and Fray 1939). The air pressure within these cysts has sometimes been recorded. In Brown and Brock's case it was $-2+2$ cm. H_2O and remained unaltered by the aspiration of several hundred ml. of air. In Kaltreider and Fray's case it was $-6+5$ cm. H_2O and the size of the cavity and the pressure were unchanged by aspirating two litres of air. In Pearson's case the pressure was very much higher: $+4+16$ cm. in the cavity, while the initial pleural pressure found when inducing artificial pneumothorax was -12–3 cm. Similar wide variations of pressure are found in spontaneous pneumothorax.

It is only the unfortunate few that pump themselves up to desperately high levels. In either condition a state of equilibrium, depending on the precise anatomy of the valve, is reached in every case. If it closes completely as soon as the inspiratory effort ceases, the minimum pressure within the cavity will be about atmospheric, and the maximum reading will represent a balance between the expiratory pulmonary pressure on the retained air and the elastic tension of the surrounding lung. The high positive readings reached by Pearson (1930) or found in tension pneumothorax could never be reached by the mere retention of air drawn in by inspiratory effort. If, however, the valve did not close completely during expiration, and the pressure in the larger cartilaginous air tubes was forced up by a cough against the resistance of a closed glottis, air could be forced into the cavity as in pumping up a tyre. I think that it is in this way that the high positive pressures are produced. The ingenious researches of Dayman (1951) threw considerable light on the many factors involved and led him to conclude that even in health the intrathoracic airways can behave as check valves to a slight degree during expiration, though the effect is very much greater in advanced emphysema when the elasticity of the lungs is impaired.

The clinical course taken by these cavities is as varied as are the diseases that give rise to them and the nature and varying patency of their communication with the bronchi. If the airway is cleared the cyst will collapse and disappear completely. If check valve changes to ball valve or "corking," the cavity will be replaced by atelectasis. With continued check-valve action the cyst may enlarge or remain stationary and clinically silent. It may fill with clear mucus or infection may turn it into an abscess, which in turn may discharge and heal, resolve to form a fibrous scar, or persist as bronchiectasis. These possibilities apply equally whether the cyst be large or minute.

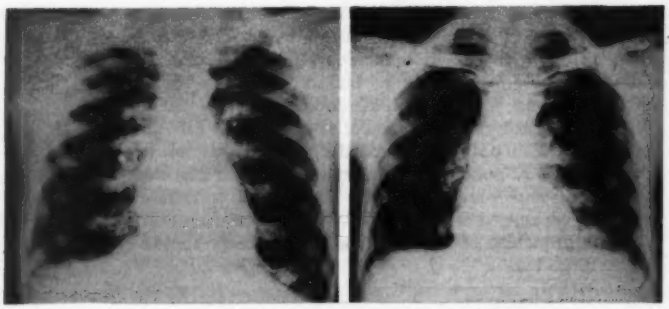
No great exception will probably be taken to what has been said so far; but it may not be so readily accepted that generalised hypertrophic emphysema is no more than the distension of every terminal air-sac into a tiny tension cyst by check-valve action; and that the disease-state that causes it is asthma. Still less is it accepted that the presence of generalised emphysema is proof of a primary asthmatic state, though no other explanation has ever been put forward. The reason for this reluctance is twofold, and as in so many controversies it arises mainly from limitations of nomenclature. Asthma is a term reserved exclusively for the classical paroxysmal type. Emphysema is a name given equally to a clinical picture and a pathological state; yet if we find the former it is by no means proof that the latter is also present.

Although we limit the meaning of the term asthma in this way, the disorder can, in fact, range through every grade of severity from the classical paroxysmal attack to a disturbance so slight and chronic that it is often regarded as lying within the limits of normal health (Lister 1955). This slight and chronic form of asthma, for which we have no generally accepted name and which is very much more common than the paroxysmal, is also the form particularly prone to produce emphysema. This view of the matter is of respectable antiquity, and was put forward very clearly by Laennec (1829), though he also was cramped, as we are, by having no generally accepted name for the minor grade. He called it the "dry catarrh", and I cannot do better than quote from him at some length. He says:

"This disease, when existing in a middling degree, frequently remains altogether latent for a long course of years, the subjects of it being no further conscious of its presence than observing that they are shorter of breath than others when they ascend an elevation or attempt to run. After a time the dyspnœa comes on in fits which last usually several days and are so severe as to merit and obtain the name of asthma." Again, "The most common cause of dyspnœa when of sufficient severity to be termed asthma is a dry catarrh latent or manifest and emphysema of the lungs is the consequence of this." Again, "Pulmonary emphysema supervenes almost always to an extensive and severe dry catarrh; and nearly all the subjects of asthma from the last named disease, on examination after death, exhibit a greater or less dilatation of some of the bronchial cells. These facts lead us to a simple explanation of the mechanism of dilatation of the air cells. It has been already shown that in the dry catarrh, the smaller bronchial tubes are frequently completely obstructed, either by the pearly sputa or by the swelling of their inner membrane. Now, since the muscles of inspiration are numerous and powerful, while expiration, on the other hand, is produced merely by the elasticity of the parts and by the feeble contraction of the intercostal muscles [sic] it must frequently happen that the air, which during inspiration had overcome the resistance opposed to its entrance by the tumid state of the bronchial membrane and the sputa, is unable to force the same obstacles during expiration, and remains therefore imprisoned in the cells, by a mechanism somewhat similar to the valve of an air gun. The succeeding inspirations, or at least such of them as are energetic, introduce a fresh supply of air into the same cells, and thereby necessarily occasion their dilatation and, provided the obstruction is of some continuance, the dilated condition of the cells will be rendered permanent. It follows from this view of the matter that the dry catarrh tends as naturally

to the production of emphysema of the lungs as the chronic mucous catarrh leads to dilatation of the bronchia."

This check-valve theory, as it may be termed, seems to have attracted little attention or support. It was soon supplanted by the expiratory theory put forward in the first place by Mendelssohn (1845) and subsequently elaborated in the forceful writings of Jenner (1865). They believed that emphysema was caused by strong expiratory effort against resistance as in the expulsive effort of childbirth, glass-blowing, the playing of wind instruments, and particularly the constant coughing of sufferers from chronic bronchitis. The theory was that during forced expiration the rigid portions of the thoracic cage—namely, the ribs—pressed on the underlying lung and forced air under pressure into those parts which were surrounded only by soft tissues, particularly around the apices and in the costophrenic angles. The presence of universal emphysema was explained by the hypothesis that as the ribs moved up and down with respiration they forced the air from immediately beneath them into those portions of the lungs underlying the intercostal spaces. The theory is easily illustrated by grasping a slightly inflated rubber balloon. The fingers represent the ribs and the bubbles of rubber extruded between them represent the emphysema. One may not think this a particularly convincing theory to have held the field for so long, but it still survives, if not quite in this form, in textbooks, and by implication in the commonplace diagnosis " chronic bronchitis and emphysema ". Recently there appear to be signs of a return to Laennec's theory.



a *b*

Fig. 1—Chest of normal man: (*a*) inspiration; (*b*) expiration.

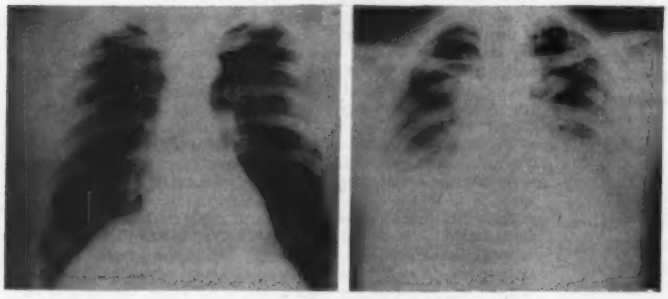
At the International Congress of Internal Medicine at Madrid last autumn Arnott (1956) referred to it and made the statement quoted at the beginning of this paper. Previously Brodie and Dixon (1903) had been led by their pharmacological experiments to the conclusion that the asthmatic state was due to check-valve action from spasm of the bronchioles, which could be induced by vagus stimulation or drugs (pilocarpine). Adami and Nicholls (1910) refer to their work, and put forward the check-valve action of asthma as a satisfying explanation for the production of emphysema. Norris and Landis (1924) mention the theory, but with no special emphasis, among several others current at that time: heredity, occupation, chronic bronchitis, and premature ossification of costal cartilages.

* * *

When one considers how many diseases can cause check-valve action, their ever-changing pattern, and the complications that may arise, one can well appreciate the difficulties of those who have sought to define and pin down a diagnosis of emphysema and to assess its severity by some clinical, radiological, or physiological formula based on a single examination.

For instance, Fletcher (1952) compared the clinical opinion of eight physicians against a radiological diagnosis of emphysema. The patients all had pneumoconiosis. Knott and Christie (1952) found wide discrepancy between clinical and radiological diagnosis. Donald (1953) made physiological tests on patients diagnosed as emphysematous on clinical and radiological grounds and found that there were too many variables (in sepsis, bronchospasm, and cardiac efficiency) to allow of close comparison. Curtis (1955) made physiological tests on patients before thoracotomy and compared his findings with the presence or absence of emphysema in biopsy specimens. In almost all his patients the operation was pneumonectomy for pulmonary tuberculosis. Yet these papers formed the subject of a leading article (*Lancet* 1956) headed " Hypertrophic Emphysema ".

Confusion will arise if we regard emphysema as a primary disease and one merely found in frequent association with other chest complaints, as so much of the literature on the subject seems to imply. It is always secondary, and the result of check-valve action. The number, size, and distribution of the distended air-sacs depend on the primary pathological process producing the check valve, and may in fact constitute a valuable clue to its nature. Thus, just as a balloon cyst or lobar emphysema (Cottom and Myers 1957) in a child suggests an abnormal bronchiole, or a group of tension cysts or area of focal emphysema may suggest tuberculosis, so universal distension indicates a condition that produces check-valve action uniformly throughout the lungs, and it is hard to think of an alternative to asthma that could do this.



a *b*

Fig. 2—Chest of man with emphysema: (*a*) inspiration; (*b*) expiration.

Again, to borrow Arnott's terminology, emphysema may be functional or structural. So far as it is functional it is potentially reversible, and it certainly will fluctuate widely in degree from time to time. Figs. 1 and 2 illustrate emphysema of this kind. Fig. 1 shows the chest of a healthy man aged 60 in maximum inspiration and expiration. Fig. 2 shows the corresponding films of a man complaining of increasing breathlessness on effort, typical of Laennec's " dry catarrh ". Here the diaphragm is depressed and flattened to a degree well below that which the most forcible normal inspiration can produce,

while check-valve action remarkably prevents anything approaching a normal range of expiration. He cannot empty his chest further because the air is trapped in the alveoli. But if his bronchioles could maintain a normal calibre during expiration he would be able to empty his chest; and there is no reason, so far as this figure indicates, why his lungs should not then return completely to normal just as the local emphysema in one of Jackson's patients would after he had extracted the peanut. Gough (1955) has shown that in the lungs of fatal cases of status asthmaticus there is no structural emphysema at necropsy, though one can be sure that if films had been taken of these patients shortly before death they would have revealed an even greater degree of distension than fig. 2. Functional emphysema then is a completely reversible state entirely comparable to transient tension cysts, which vanish when the airway is reopened. The more brief and infrequent the asthmatic attacks, the less likely are permanent structural changes to supervene, and vice versa.

* * *

To produce structural emphysema, some additional factor is required to damage the tense alveolar meshwork. In Flavell's (1952) opinion healthy alveoli cannot be ruptured by any physiological range of pressure. Moolton (1935) showed that, if the alveolar meshwork had been damaged, pressures well within the physiological range could produce cavities which would not return completely to their original size when the pressure was relieved. Gough also points out that emphysema is not found at necropsy in pure spasmodic status asthmaticus; but if chronic bronchitis (by which he presumably means infection) has been present as well, then structural emphysema is found post mortem. Given time several factors can, alone or in combination, produce this damaging effect and, as it were, fix the terminal air-sacs in their distended condition. As age advances, the skeleton becomes more rigid and the posture of habitual elevation of the ribs and bowed back becomes less and less easy to correct. Adami and Nicholls thought that the capillaries might be compressed and so the blood-supply to the tense walls of the alveoli would be impaired. This may be true. Certain it is that as we grow older bodily structures tend to lose elasticity, and people vary greatly in the age at which these changes begin and in the organs most affected. We know they can arise in the lungs and cause the so-called small-lunged or atrophic emphysema. If a lung undergoing this degenerative process has been subject for several years to the check-valve action of chronic asthma or "dry catarrh", the classical picture of hypertrophic emphysema will be produced in its structural sense. The lungs are bulky, pale, and dry, and have the feel of a feather pillow. Microscopically the terminal air-sacs are seen to be distended, with thin, atrophic walls, many of which have ruptured so that adjacent alveoli coalesce. Heavy smoking and living in polluted air, or the inhalation of noxious dusts, bring the risk of chemical and mechanical damage.

Infection, however, is by far the most common and important damaging factor. It so often dominates the clinical picture and compels the patient to seek our advice that we tend to regard it as the primary cause of the emphysema. Infection also commonly dominates the pathological picture, as indeed it must, whenever it is present, seeing that purely functional emphysema leaves no post-mortem change. But non-specific infection alone cannot produce generalised emphysema. It is true that histologically in acute bronchopneumonia one can find areas in which their walls have ruptured and the alveoli have become confluent, and no doubt the same mechanisms have been at work to produce these changes as in more chronic illnesses. It is also true, as already stated, that conditions of long standing—for instance, tuberculosis and pneumoconiosis—can produce tension cysts and areas of focal emphysema, but in these diseases the changes will be relatively gross and uneven in distribution. Other parts of the lung will be collapsed from complete bronchial obstruction or consolidated or fibrotic from the primary pathological process. By contrast the dilatation of and damage to the alveoli and bronchioles in "chronic bronchitis and emphysema" is spread relatively evenly throughout the whole of the lung parenchyma.

There are other reasons for suggesting that this disease is not primarily the result of infection. The pathological picture is well described and illustrated by Reid (1954). She points out that the earliest change consists in an extension beyond the normal number and range of distribution of goblet cells and simple catarrh of the bronchial mucosa. This entirely conforms to the natural history of the disease as observed clinically. The more carefully we conduct our history-taking and examination, the more will we find evidence of a long-standing, constitutional, hereditary, or allergic state corresponding to Laennec's "dry catarrh". Other members of the family may have been asthmatic or bronchial. There may be a history of hay-fever or frequent colds that start in the nose and later settle on the chest, or of winter and morning cough often attributed to smoking, all preceding the first recognisable onset of infection. Many patients will distinguish between attacks of wheezing with thick, mucoid sputum, which they term asthma, and those with looser, yellow sputum, often associated with fever, which they term bronchitis.

Precisely as one can trace in one's practice an unbroken range of cases through every grade of severity, from the mildest examples of dry catarrh to those in whom the entire respiratory tract is heavily and permanently infected, so one can observe in them the corresponding grade of emphysema from the reversible or functional to the permanent or structural. The pathological picture also conforms. As the catarrh and mucus secretion increases so will the mechanical effects of the bronchial obstruction increase. These will not only be check valves. There will also be partial blocks, corkings, and ball valves, to use Jackson's terms, all according to the precise site and degree of secretion and congestion at the moment, each producing its appropriate effect of emphysema, rhonchi, or atelectasis. To these will be added the secondary effects of the inflammatory process, in the form of minute patches of pneumonia, and small abscesses, all in various stages of activity and resolution, which make up the full-blown picture described by Reid.

* * *

Why does bronchitis become chronic in only an unfortunate minority? Why do not all who dwell or work in polluted atmospheres develop emphysema? And why do we find atrophic, small lungs in some and hypertrophic emphysema in others? The reason must surely be that the lungs that develop emphysema are different. They have reacted in a different way—in

a word they are " allergic " (for that is all that this term means) and subject in some degree to the chronic, dry catarrh of Laennec and the check-valve action that this state applies.

The lungs of these people present a constantly shifting pattern depending on fluctuations in the asthmatic state, variations in degree of infection, and the process of ageing. Occupation, environment, and the efficiency of the cardiovascular system all have an additional and indirect bearing. Thus at any given moment the degree of emphysema demonstrable by radiography or at the bedside will be in part functional or reversible because of check-valve action, and in part structural or irreversible from breakdown of the alveolar meshwork.

One may make a more or less shrewd estimate of the relative proportions of these two elements (the functional and the structural) from the history and clinical picture. In an elderly patient with rigid chest, inelastic skin, and hardened arteries, who has suffered for years from attacks of " bronchitis " with purulent sputum or has lived and worked in a polluted atmosphere, one would naturally expect the condition to be largely irreversible, the results of treatment meagre and the prognosis correspondingly poor. In younger subjects with a more spasmodic history, little or no infection, and otherwise good general health and environment, the functional element might be expected to predominate. On such a view one can readily understand—indeed one would expect—the poor results obtained with ephedrine and aminophylline in emphysema (Whitfield et al. 1950, 1951). No drug could alter a condition due entirely to structural damage. The observations were made when no bronchospasm was present. Clinical details of the patients were not given, but the authors say that they were not clinically asthmatic and that there was nothing to suggest that asthma had been the cause of their ventilatory insufficiency. Laennec might, however, have regarded them as subject to " dry catarrh ".

Summary

Emphysema is never a primary disease, but always secondary.

It is a state of over-distension of the terminal air-sacs of the lungs by check-valve action in the small bronchi or bronchioles. A variety of conditions can cause this.

Tension cysts or focal emphysema arise from the partial obstruction of one or a few bronchioles.

Generalised emphysema results only from asthma—particularly from its minor and chronic form, rather than from the classical paroxysmal type.

Functional emphysema is the distension of healthy alveoli by check-valve action. It can be completely relieved by the removal of the obstruction.

Structural emphysema is the irreversible state resulting from damage to the over-distended alveolar meshwork by secondary factors.

REFERENCES

Adami, J. G., Nicholls, A. G. (1910) Principles of Pathology; vol. 2, pp. 243, 259. London.
Anspach, W. E., Wolman, I. J. (1933) *Surg. Gynec. Obstet.* **56**, 635.
Arnott, W. M. (1956) *Lancet*, ii, 676.
Brodie, T. G., Dixon, W. E. (1903) *Trans. path. Soc. Lond.* **54**, 17.
Brown, A. L., Brock, W. (1942) *J. thorac. Surg.* **11**, 617.
Christie, R. V. (1934) *J. clin. Invest.* **13**, 295.
Cottom, D. G., Myers, N. A. (1957) *Brit. med. J.* i, 1394.
Curtis, J. K., Rasmussen, H. K., Mendenhall, J. T. (1955) *Amer. Rev. Tuberc.* **72**, 589.
Dayman, H. (1951) *J. clin. Invest.* **30**, 1175.
Donald, K. W. (1953) *Brit. med. J.* i, 415.
Flavell, G. (1952) in Marshall and Perry's Diseases of the Chest. London.

References continued at foot of next column

EFFECTS OF PENICILLAMINE AND DIMERCAPROL ON TURNOVER OF COPPER IN PATIENTS WITH WILSON'S DISEASE

S. B. OSBORN
B.Sc. Lond., A.Inst.P.
PRINCIPAL PHYSICIST, UNIVERSITY COLLEGE HOSPITAL, LONDON W.C.1

J. M. WALSHE
M.A., M.B. Cantab., M.R.C.P.
ASSISTANT, MEDICAL UNIT, UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, LONDON, W.C.1

IT is now established that in patients with Wilson's disease (hepatolenticular degeneration) there is an inability to synthesise the copper-binding serum-protein cæruloplasmin, and copper therefore accumulates in the body, chiefly in the brain and liver. Associated with these phenomena are an increased excretion of copper in the urine and a low level of copper in the plasma. Moreover 60–80% of the serum-copper is " direct reacting"—i.e., not bound to cæruloplasmin—in contrast to healthy people, in whom only about 10% of the copper is not protein-bound. The evidence for these observations has been reviewed by one of us (Walshe 1957).

Studies with radioactive copper (^{64}Cu) (Earl et al. 1954, Bearn and Kunkel 1955, Bush et al. 1955) have shown that, in healthy people, the copper is rapidly removed from the plasma, to reappear about twelve hours later bound to cæruloplasmin. In patients with hepatolenticular degeneration this rapid fall and secondary rise do not take place, the ^{64}Cu level falling slowly but steadily during the period of study. The patients with Wilson's disease excreted a higher percentage of ^{64}Cu in the urine and far less in the stools than did the healthy people.

Hitherto the most effective treatment for patients with Wilson's disease has been to remove copper from the body with repeated courses of intramuscular dimercaprol (Denny-Brown and Porter 1951). In cases which are not resistant to this treatment and in patients who do not become sensitive to dimercaprol significant improvement may take place (Bearn 1956). Penicillamine hydrochloride by mouth in doses up to 1·5 g. daily may be more effective than dimercaprol in promoting cupruresis (Walshe 1956, Bearn 1957).

In the present study the efficacy of dimercaprol and penicillamine in increasing the excretion of intravenously injected ^{64}Cu were compared. The number of experiments

DR. LISTER : REFERENCES—*continued*

Fletcher, C. M. (1952) *Proc. R. Soc. Med.* **45**, 577.
Gough, J. (1955) *Lancet*, i, 161.
Hundato, A., Fray, W. W. (1954) *J. clin. Invest.* **13**, 1027.
Jackson, C. (1930) *J. Amer. med. Ass.* **95**, 639.
Jenner, Sir W. (1871) in Reynolds, J. R. " A System of Medicine "; vol. 3, p. 475. London.
Kaltreider, N. L., Fray, W. W. (1939) *Amer. J. med. Sci.* **197**, 62.
Knott, J. M. S., Christie, R. V. (1951) *Lancet*, i, 881.
Koontz, A. R. (1925) *Bull. Johns Hopk. Hosp.* **37**, 340.
Laennec, R. T. H. (1829) A Treatise on the Diseases of the Chest; pp. 159 410, 92. London.
Lancet (1956) i, 30.
Lister, W. A. (1955) *Lancet*, ii, 733.
Mendelssohn, A. (1845) Der Mechanismus der Respiration und Cirkulation; p. 368. Berlin.
Miller, R. T. (1926) *Arch. Surg., Chicago*, **12**, 392.
Miller, W. S. (1933) *Amer. Rev. Tuberc.* **28**, 359.
Moolten, S. (1935) *Arch. Path (Lab. Med.)*, **19**, 825.
Norris, G. W., Landis, H. R. M. (1924) Diseases of the Chest; p. 533. Philadelphia.
Parmalee, A. H., Apfelbach, C. W. (1931) *Amer. J. Dis. Child.* **41**, 1380.
Pearson, S. V. (1930) *Brit. med. J.* i, 380.
Reid, L. McA. (1954) *Lancet*, i, 275.
Sellors, T. H. (1938) *Tubercle*, **20**, 49.
Whitfield, A. G. W., Arnott, W. M., Waterhouse, J. A. H. (1950) *Quart. J. Med.* **19**, 319.
— — — (1951) *Lancet*, i, 490.

was limited to a minimum to avoid giving unnecessary doses of a radioactive material to adolescents. The opportunity was taken to make surface counts over the body to try and determine the site of concentration of the isotope after injection.

Methods

The studies were made on one healthy male, aged 22, and on three patients with Wilson's disease. Two of these have been reported previously (Walshe 1956, cases 3 and 5), and the third was a boy aged 18, who had the typical disease with a history of three years' tremor and slurred speech. All three patients had difficulty in providing urine to a strict time schedule, but only two specimens were lost during the experiments (see figures).

The chemical method of estimating copper was that described by Earl (1954) and modified for greater accuracy by Walshe (1956).

Since inorganic salts of copper are toxic, it was important that the mass of copper used should be as small as possible. A method was developed by Payne et al. (1957) at the A.E.R.E.,

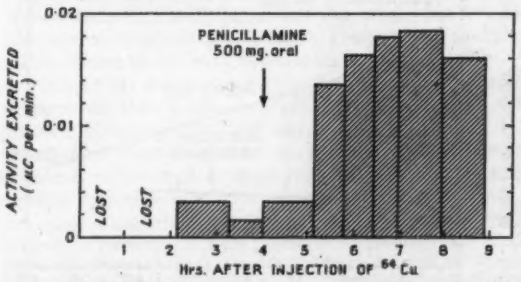


Fig. 1—Excretion of ^{64}Cu by case 1. First two specimens of urine were lost.

Harwell, for producing copper of very high specific activity which at the time of injection had a mass of 1–3 μg. of Cu for an activity of 100 μC. The urine was assayed for radioactivity by counting samples dried in planchettes, as described by Anderson et al (1956), with a G.E.C. type EHM 2 end-window Geiger-Müller tube. The tube was standardised by counting a planchette containing a known fraction of the original ^{64}Cu.

For external counting of the liver a sensitive scintillation counter with a thallium-activated sodium-iodide crystal was used. This was adjusted against constant skin markings by the technique of Riddell et al. (1957).

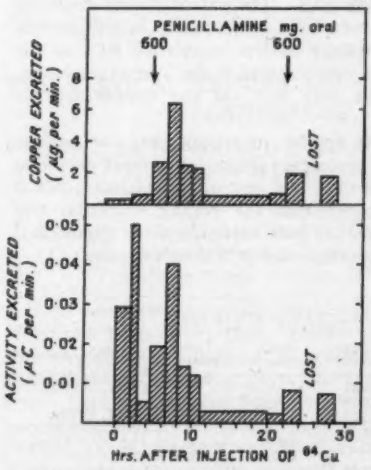


Fig. 2—Excretion of copper by case 2. One specimen of urine at about 25 hours was lost.

Results

In the pilot experiment made on case 1 after the injection of ^{64}Cu, the first specimen of urine was lost, but by four hours the rate of excretion was 0·0015 μC a minute. At this point she was given penicillamine 500 mg. by mouth, and thereafter there was a steady increase in activity secreted until at

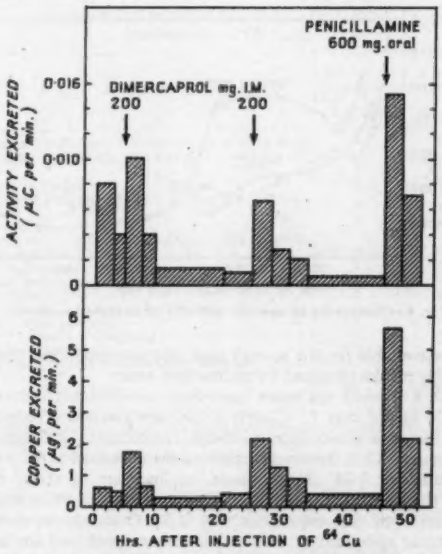


Fig. 3—Excretion of copper by case 3.

eight hours she was excreting ^{64}Cu at 0·0186 μC a minute, a twelvefold increase (fig. 1).

In case 2 the excretion of copper was determined both by radioactive and by chemical methods for twenty-nine hours after the injection of ^{64}Cu 100 μC. During this time he was given penicillamine 600 mg. by mouth at four hours and again at twenty-two hours. As in case 1, the excretion of ^{64}Cu had diminished to 0·005 μC a minute by four hours. After the first dose of penicillamine it increased to a maximum of 0·04 μC a minute and did not return to the resting value for nearly eight hours. During this time 8·52 μc was excreted; if the initial rate had been maintained throughout, the amount would have been 1·92 μC. Following the second dose of penicillamine at twenty-two hours there was again an immediate increase in the radioactivity of the urine (fig. 2).

The urinary excretion of copper determined by chemical means shows a close correspondence over this twenty-nine hour period, except that the initial high excretion of ^{64}Cu is naturally not reflected by the excretion of non-radioactive copper. The increase of excretion due to penicillamine occurs at the same point in the time scale and is of very similar magnitude on each occasion. During the eight hours after the first dose of penicillamine 1300 μg. of copper was excreted; at the base-line rate the excretion would have been 200 μg. The

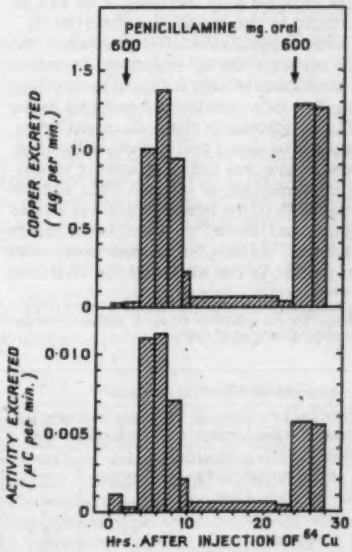


Fig. 4—Excretion of copper by healthy man.

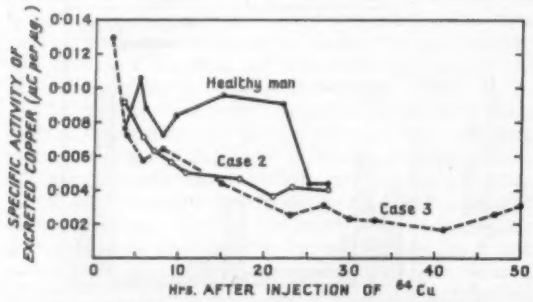


Fig. 5—Variations in specific activity of excreted copper.

figures available for the second peak also corresponded closely with the results obtained by radioactive assay.

Case 3 showed the same immediate considerable excretion of ^{64}Cu as did case 2. Clearly it had not reached a base-line when he was given intramuscular dimercaprol 200 mg. at four hours. This, however, increased the excretion of ^{64}Cu to a maximum of 0·01 μC a minute, an increase of about four times the calculated base-line. The excretion of ^{64}Cu during the period of the cupruresis was 2·5 μC compared with a theoretical excretion of 0·75 μC if dimercaprol had not been given. A second injection of dimercaprol at twenty-five hours had an effect almost exactly like that of the first, with a total excretion of 2·13 μC against a calculated 0·58 μC for the period. At forty-six hours penicillamine 600 mg. was given by mouth. This was followed by an increase in excretion of ^{64}Cu from 0·00065 μC a minute to a peak of 0·015 μC a minute—a twenty-fold rise, compared with increases of four and six for dimercaprol.

The excretion of copper studied by chemical methods showed a similar picture, with an increase in the cupruresis of five-fold for each of the two injections of dimercaprol and one of fourteen-fold for penicillamine (fig. 3).

Finally, a healthy man was studied by a similar experimental procedure. He was given two oral doses of penicillamine, each of 600 mg., at four hours and at twenty-four hours. The excretion of ^{64}Cu reached a peak of 0·0123 μC a minute after the first dose. Calculated from the area of the peak this is a forty-seven-fold increase above the base-line. However, after the second dose the peak was only nineteen times the base-line. These values compare with increases of 48 and 44 times for copper determined by the chemical method (fig. 4).

In cases 2 and 3 with hepatolenticular degeneration the specific activity * of the copper in the urine decreased steadily, whereas in the healthy man it stayed high for about twenty-four hours before decreasing to a value similar to that found in the two patients (fig. 5). The significance of this is discussed below.

Surface counts were made on case 3 and on the healthy man. These showed that, while there was sufficient activity to estimate, the only site of concentration of injected ^{64}Cu was the liver. In the healthy man 95% of the injected ^{64}Cu was located in the liver at ten hours, and thereafter there was a steady decline to 70% at fifty hours. In case 3 there was never more than 40% of the ^{64}Cu present in the liver, and the variations of liver activity observed after the doses of the sequestrating agents are of very doubtful significance (fig. 6).

The results are summarised in the accompanying table.

* The specific activity is calculated by dividing the activity of copper excreted in μC a minute by the quantity in μg. a minute. It has nothing to do with absolute quantities of metal.

Discussion

The original intention of this work was not to study the differences in copper metabolism between the healthy and patients with Wilson's disease, though this was in fact demonstrated by a comparison of the response of these two groups to penicillamine at four hours and at twenty-four hours.

In the healthy man there was a forty-seven-fold increase in the excretion of ^{64}Cu at four hours but only twenty-fold at twenty-four hours. Presumably by this time much of the ^{64}Cu had become bound to cæruloplasmin and was no longer available for excretion. In Wilson's disease, on the other hand, the response to penicillamine did not show this decrease (case 2, thirteen-fold at four hours; case 3, twenty-one-fold at forty-six hours). Presumably since the copper does not become protein-bound it remains freely available for excretion throughout the period of study.

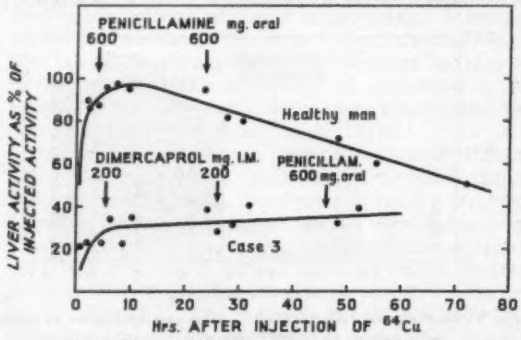


Fig. 6—Liver activity in case 3 and in healthy man.

A similar conclusion can be drawn from a study of the specific activity of the copper excreted. Fig. 5 shows that, in the healthy man, the specific activity of the urinary copper remained high for about twenty-four hours before decreasing sharply, owing again, presumably, to protein-binding of ^{64}Cu. In cases 2 and 3 there was a steady decline in specific activity as the ^{64}Cu became diluted throughout the body pool. The external body-counting also revealed the metabolic abnormality in the patient studied. In the healthy control more than 90% of the injected copper was concentrated in the liver at ten hours, but in the patient only 40% of the copper was so concentrated.

It might at first appear surprising that the healthy man had a greater percentage increase in copper excretion after penicillamine than had any of the patients; but it must be remembered that the resting excretion was extremely small, and the peak excretion never approached the very high values observed in Wilson's disease.

Person	Excretion of copper (μg. a minute)					Excretion of ^{64}Cu (μC a minute)					
	Resting	After penicillamine	Times greater*	After dimercaprol	Times greater*	Resting	After penicillamine	Times greater*	After dimercaprol	Times greater*	Total ^{64}Cu excreted
Healthy man	0·026	1·37	×48	—	—	0·0002	0·0123	×47	—	—	5·7 μC in 28 hr.
	0·031	1·28	×44	—	—	0·00028	0·0057	×19	—	—	
Case 1						0·0015	0·0186	×12	—	—	4·2 μC in 9 hr.
Case 2	0·54	6·36	×12	—	—	0·003	0·040	×13			19 μC in 28 hr.
Case 3	0·54			1·7	×3	0·0025			0·010	×4	11·5 μC in 52 hr.
	0·38			2·1	×5·5	0·0010			0·0066	×6·6	
	0·39	5·6	×14	—	—	0·0007	0·015	×21			

* The increase is calculated from the area of the peak, not from the height.

One other point very clearly shown by these experiments is that penicillamine is a very powerful agent for the mobilisation of body-copper, and that the increased copper which appears in the urine is released from body stores and has not been carried through from the gut. There is also support for the view that penicillamine is more active than dimercaprol in this respect.

Summary

The excretion of an injected dose of 100 μC of ^{64}Cu was studied in one healthy man and three patients with Wilson's disease together with the effect of oral penicillamine and intramuscular dimercaprol.

The results show clearly that penicillamine is very active in promoting the excretion of copper and appears to be superior to dimercaprol in this respect. There is good correspondence between the chemical and radioactive determinations of urinary copper.

The bulk of the injected copper was concentrated in the liver by ten hours in the healthy man, reaching a maximum of more than 90% and then decreasing steadily to 70% by fifty hours, whereas in Wilson's disease the greatest concentration in the liver never exceeded 50%.

Study of the specific activity of the copper in the urine supports the theory that, in healthy people almost all the injected copper becomes firmly bound to protein by twenty-four hours, whereas in patients with Wilson's disease it mixes with a large body pool of copper and remains readily available for excretion at the glomerulus.

We wish to thank Dr. Michael Ashby, Dr. H. Kryszek, and Dr. S. Nevin for permission to study patients under their care; Mr. B. R. Payne and his associates at the Atomic Energy Research Establishment, Harwell, for their invaluable help in supplying copper of very high specific activity; and Dr. W. P. Kennedy, of the Distillers Company (Biochemicals) Ltd., for a most generous gift of penicillamine.

REFERENCES

Anderson, J., Emery, E. W., McAlister, J. M., Osborn, S. B. (1956) *Clin. Sci.* **15**, 567.
Bearn, A. G. (1956) *Amer. J. Med.* **21**, 134.
— (1957) ibid. **22**, 747.
— Kunkel, H. G. (1955) *J. Lab. clin. Med.* **45**, 623.
Bush, J. A., Mahoney, J. P., Markowitz, H., Gubler, C. J., Cartwright, G. E., Wintrobe, M. M. (1955) *J. clin. Invest.* **34**, 1766.
Denny-Brown, D., Porter, H. (1951) *New Engl. J. Med.* **245**, 917.
Earl, C. J. (1954) *Lancet*, i, 234.
— Moulton, M. J., Selverstone, B. (1954) *Amer. J. Med.* **17**, 205.
Payne, B. R., Scargill, P., Cook, G. B. (1957) Proceedings of UNESCO Radioisotope Conference, Paris. To be published.
Riddell, A. G., Griffiths, D. B., McAlister, J. M., Osborn, S. B. (1957) *Clin. Sci.* **16**, 315.
Walshe, J. M. (1956) *Amer. J. Med.* **21**, 487.
— (1957) *Brit. med. Bull.* **13**, 132.

THE CLINICAL SIGNIFICANCE OF STERNAL TENDERNESS

THE VALUE OF SELECTIVE MARROW BIOPSY IN MALIGNANT DISEASE

N. D. GOWER

M.B. Lond.

SENIOR REGISTRAR IN PATHOLOGY,

EDGWARE GENERAL HOSPITAL, LONDON

BONE tenderness in hæmopoietic disorders is well known (Wintrobe 1946, Witts 1946, Whitby and Britton 1953), and may affect any bone, most commonly the sternum, particularly in leukæmia, polycythæmia, and myelomatosis. Less attention has been paid to the occurrence of bone tenderness in association with metastatic neoplasms and reticuloses, although some workers have reported that diagnostic material may be aspirated more regularly from tender than from non-tender bone.

CORRELATION BETWEEN DIAGNOSIS AND STERNAL TENDERNESS IN 200 CASES

Diagnosis	No. of cases in which sternal tenderness was	
	Present	Absent
Carcinoma: malignant cells present in marrow film	15	2
Carcinoma: malignant cells not found in marrow films	1	22*
Myeloid reticulosis	6	0
Reticuloses without evidence of marrow involvement	0	5
Myelomatosis	6	5
Plasmacytoma, apparently solitary, with normal bone-marrow	0	3
Acute leukæmia	5	7
Chronic leukæmia	1	9
Polycythæmia vera	2	2
Myelofibrosis	0	3
Megaloblastic anæmia	15	22
Other "primary" cytopenia	3	6
Hæmolytic anæmias	0	7
Iron-deficiency and miscellaneous anæmias	7	46
Total	61	139

* 2 of these cases were found at necropsy, one and four weeks later, to have marrow metastases. In 1 case the sternal-puncture needle had been inserted between two nodules of growth.

Whitby and Britton (1953) and Lopes Cardozo (1954) recommend puncture of tender bone in the diagnosis of secondary carcinoma.

Amy and Jaimet (1953) and Jaimet and Amy (1956) emphasise the importance of selective puncture of tender bone in patients presenting diagnostic problems, and report the finding of tumour cells in the marrow in unsuspected cases of neoplasm.

Varadi (1955) found Sternberg-Reed cells in the marrow of five patients with Hodgkin's disease by "aimed" puncture of tender parts of the sternum. This degree of success is in sharp contrast to that of other writers on the subject (Cooper and Watkins 1949, Baryd et al. 1954).

Marrow puncture, however, is still generally done as a blind biopsy of either the iliac crests or the upper part of the sternum. Although this is satisfactory in the diagnosis of hæmopoietic disorders it probably accounts for the comparative rarity with which neoplasms are diagnosed by marrow examination.

Method

To assess the frequency and significance of tenderness 200 consecutive patients about to undergo marrow puncture were examined for tenderness of the sternum. The bone was palpated from the manubrium downwards, firm pressure being made with the ball of the index finger. Many healthy people complain of discomfort over the lower third of the sternum when examined by this method; therefore tenderness was regarded as present only if it was very definite. Most of the patients who experienced tenderness on palpation also complained of pain on light percussion of the sternum, but the tenderness was elicited less constantly in this way.

Marrow was aspirated from these tender spots or, if tenderness were absent, from the sternum at the junction of its upper two-thirds and lower third.

Results

Of the 200 patients 61 were considered to have tenderness of the sternum. In most cases the tenderness was quite sharply localised to small areas, usually in the lower third of the sternum. Diffuse sternal tenderness was seen in a few cases of metastatic carcinoma, myelomatosis, acute leukæmia, and, most noticably, in 4 of 6 patients with myeloid reticulosis as defined by Israëls (1951). In these patients generalised bone tenderness and spontaneous bone pain were usual.

The diagnoses and presence or absence of sternal tenderness in the 200 patients is summarised in the accompanying table.

Although sternal tenderness was found, as expected, to be common in patients with neoplastic blood disorders and in those with bone-marrow metastases, it was not confined to these groups of patients, nor was it found as often as expected in patients with leukæmia or with myelomatosis. In the megaloblastic anæmias sternal tenderness was found only in severely anæmic patients; it disappeared with successful treatment, as in the leukæmias, but very much more rapidly, usually being absent after three or four days and indicating improvement in advance of the rise in hæmoglobin level, sometimes even before the reticulocytosis began. The patients with non-hæmopoietic malignant disease studied did not form a representative sample of all such cases in the hospital being biased in favour of cases with known or suspected metastases in the marrow. Even so, selective puncture of tender areas of bone proved of diagnostic value in some instances.

Illustrative Case-reports

Case 1.—A man, aged 60, with carcinoma of the prostate, developed refractory normochromic anæmia. No primitive cells were found in his peripheral blood. Radiography of his skeleton showed no evidence of metastases in bone. The acid and alkaline phosphatase levels in the serum were normal. The blood-urea level was 80 mg. per 100 ml., and it was thought that the anæmia might be secondary to renal impairment, but puncture of a tender sternum revealed clumps of carcinoma cells. Simultaneous puncture of the non-tender left iliac crest yielded normal marrow.

Case 2.—A man, aged 47, was admitted to hospital for the investigation of sciatica. Radiography showed collapse of a lumbar vertebra, and the peripheral blood showed leuco-erythroblastic anæmia. A diagnosis of secondary carcinoma was considered, but no primary growth was found. Marrow aspirated from a sharply localised tender area of the sternum showed masses of abnormal reticulum cells, yet simultaneous puncture 1 cm. above the tender spot yielded normal marrow. The diagnosis of myeloid reticulosis was confirmed at necropsy.

Case 3.—A woman, aged 76, was admitted to hospital for the investigation of cervical lymphadenopathy. She had no anæmia, but her peripheral blood showed neutrophil leucocytosis. Lymph-node biopsy showed a necrotic tumour on which no firm opinion could be given. The sternum and ribs were tender, and metastatic carcinoma was diagnosed by sternal puncture. Necropsy disclosed a small carcinoma of the stomach with metastases in lymph-nodes, liver, and bones.

Conclusions and Summary

Bone tenderness, in particular sternal tenderness, may develop in patients with various disorders but is particularly common in those with bone-marrow metastases and those with myeloid reticulosis.

Selective puncture of tender bone will improve the chances of finding abnormal cells in such cases.

Selective puncture of the marrow is recommended in the investigation of obscure cases, particularly if unexplained anæmia, bone destruction, or lymphadenopathy is present.

It is a pleasure to thank Dr. George Discombe for his advice and for his criticism of this paper.

REFERENCES

Amy, H. E., Jaimet, C. H. (1953) *Canad. med. Ass. J.* **69**, 424.
Bayrd, E. D., Paulson, G. S., Hargraves, M. M. (1954) *Blood*, **9**, 46.
Cooper, T., Watkins, C. H. (1949) *ibid.* **4**, 534.
Israëls, M. C. G. (1951) *Lancet*, **i**, 978.
Jaimet, C., Amy, H. E. (1956) *Ann. intern. Med.* **44**, 617.
Lopes Cardozo, P. (1954) Clinical Cytology Using the May-Grünwald-Giemsa Stained Smear. Leyden; chapter 6.
Varadi, S. (1955) *Brit. J. Haemat.* **1**, 184.
Whitby, L. E. H., Britton, C. J. C. (1953) Disorders of the Blood. 7th ed., London; pp. 509, 540, 552, 555.
Wintrobe, M. M. (1946) Clinical Hæmatology. 2nd ed., London; pp. 594, 695.
Witts, L. J. (1946) *in* Price, F. W. A Textbook of the Practice of Medicine. 7th ed., London; pp. 835, 838, 840.

SEX REVERSAL: OVARIAN TISSUE ASSOCIATED WITH MALE NUCLEAR SEX

D. J. B. ASHLEY
M.D. Lpool
SENIOR REGISTRAR IN PATHOLOGY, DAVID LEWIS NORTHERN HOSPITAL, LIVERPOOL

C. H. JONES
M.D. Lpool
ASSISTANT PATHOLOGIST, ALDER HEY CHILDREN'S HOSPITAL, LIVERPOOL

THE syndrome of gonadal dysgenesis, Turner's syndrome, is now a well-recognised, although uncommon, disorder of sexual development. In its classical form it is characterised by female (or near female) bodily habitus, atrophic gonads, absence of secondary sex characters, amenorrhœa, and increased urinary excretion of pituitary gonadotrophic hormones. Often there are associated congenital defects—notably short stature, webbing of the neck, and cubitus valgus. The principal anomaly is in the gonads, which are represented only by a primitive genital ridge consisting of connective tissue and a few mesonephric remnants (Wilkins and Fleischmann 1944, Grumbach et al. 1955).

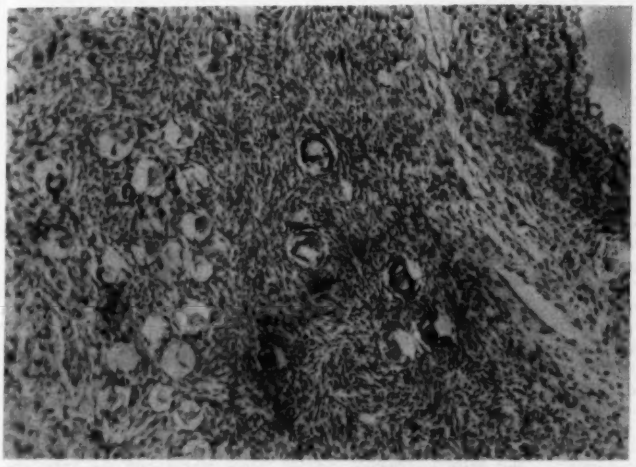
Recently it has become possible to determine the "genetic" sex of an individual by examining the cell nuclei of the skin (Moore, Graham and Barr 1953) and of the buccal mucosa (Moore and Barr 1955). Though it has not been rigidly proved that the chromatin bodies seen in a high proportion of the cells of normal females are the XX-chromosome complex, the presence of these bodies is generally held to indicate the female genotype (Lennox 1956). These tests of genetic sex have been applied to many people with Turner's syndrome, and it has been found, in most cases, that the epithelial cells are chromatin-negative—i.e., that the genetic sex is probably male (Polani, Hunter, and Lennox 1954, Grumbach et al. 1955). This view is upheld by this syndrome's association with coarctation of the aorta, a congenital anomaly normally largely confined to males, and by the observation (Polani, Lessof, and Bishop 1956) that 4 of 25 patients with Turner's syndrome had anomalies of red-green colour-vision, a defect inherited as a sex-linked recessive characteristic and ten times commoner in males than in females.

The case we report here may be discussed within the general framework of Turner's syndrome but presents certain anomalous features and shows a much closer analogy with the syndrome of testicular agenesis (Klinefelter et al. 1942).

Case-report

An only child was referred to Alder Hey Children's Hospital at the age of 10 days because of doubts about the "true sex". The baby had labia majora and minora and a phallus suggestive of an enlarged clitoris on which there was a hypospadiac urethral opening through which urine passed. In front of the anus was a vagina with a second urethral opening on its anterior wall. It was found subsequently that a single urethra left the bladder but divided into two after a short course. Otherwise the baby, though small, was apparently normal, with no evidence of cardiovascular or skeletal abnormalities. The bone age at 18 months corresponded to the chronological age. The urinary excretion of 17-ketosteroids, determined on three occasions in the first 9 months, was 0·64, 0·22, and 0·25 mg. daily. These results are within the normal range for this age (Wilkins et al. 1955).

Laparotomy at 17 months of age revealed a uterus and fallopian tubes of normal size. The two ovaries, in their normal position, were slightly enlarged and cystic. There was no sign of testicular tissue retroperitoneally or in the inguinal canals or



Biopsy of ovary: at one edge can be seen part of the wall of a follicular cyst, while the remainder of the tissue shows many oogonia and immature graafian follicles. (Hæmatoxylin and eosin. ×110.)

of any definite structures of wolffian origin. A small piece of the right ovary was removed for microscopy. Sections showed that the specimen contained a follicular cyst and that many oogonia were present, although formed graafian follicles were few (see figure).

Other investigations.—Smears of the buccal mucosa were taken from both sides of the mouth on four occasions and were examined for the presence of " sex chromatin ". A skin biopsy was similarly examined. In every instance the proportion of cells showing the " sex chromatin " was less than 6%, a figure well below the lower limit seen in normal females. Blood-films were also examined for " drumsticks " in the polymorphonuclear leucocytes (Davidson and Smith 1954). Three separate films were examined, and in each more than six " drumsticks " were seen in an examination of five hundred cells.

Follow-up.—At the age of 20 months the child was thriving.

Discussion

This case presents several unusual features. Clinically the appearance was of a female infant with an enlarged phallus. She could therefore be regarded as a case of female pseudohermaphroditism. Examination of the skin and buccal mucosa revealed that the nuclear sex was male, and that she should therefore be considered as a case of Turner's syndrome with enlargement of the phallus (Grumbach et al. 1955). The finding of a female frequency of " drumsticks " on the polymorphonuclear leucocytes need not be regarded as invalidating the diagnosis of the genetic sex from the epithelial cells. Ashley (1957) has shown that the sex-chromatin mass on the nuclear membrane and the " drumstick " on the polymorphonuclear leucocyte are not identical, and similar discrepancies have been seen in other cases of gonadal dysgenesis (Greenblatt 1957).

The histological appearances of the ovary present a much more serious discrepancy. This case is the only one which can be traced in which the gonad of an individual of male nuclear sex shows the histological features of an ovary; all the usual structures of the ovary, including germinal elements, are present.

Female Pseudohermaphroditism

The diagnosis of female pseudohermaphroditism must be considered first. This condition is seen in adrenal cortical hyperplasia (Broster et al. 1953) when the adrenal glands produce excessive amounts of androgenic hormones causing masculinisation of the female and precocious virilism. Such persons are of female nuclear sex. The present patient showed no evidence of virilism, she had no growth of sexual hair, and her excretion of urinary 17-ketosteroids was within normal limits for her age. There is also a group of female pseudohermaphrodites without adrenal hyperplasia. Few recent reports of this condition have been made. Armstrong (1955) included 2 cases in a review of diversities of sex and found that the nuclear sex in both was female.

Turner's Syndrome

The occurrence of individuals of male genotype—i.e., absence of the sex-chromatin body from the resting nuclei of the cells of the skin and buccal mucosa—with female phenotype, female bodily habitus, and internal genitalia arising from the müllerian ducts, is now well recognised. Most of these cases belong to the group usually called Turner's syndrome, the main features of which are outlined above, and usually show no evidence of masculinisation except for the few instances in which there has been enlargement of the phallus; 3 such cases have been reported recently (Gordan et al. 1955, Grumbach et al. 1955) in which laparotomy and section of the gonad showed the usual spindle-celled connective-tissue stroma and mesonephric remnants of the gonad of Turner's syndrome together with the presence of nests of " Leydig " cells in the medullary regions. These cells have been recorded in the gonad of cases of the syndrome without enlargement of the clitoris, yet clitoral hypertrophy may be related to the functional activity of such cells. Cells of this type were not found in the biopsy specimen taken from our patient, which was, however, taken from the peripheral part of the ovary.

Turner's syndrome is usually regarded as due to a failure of the primitive indifferent gonad to develop at all, possibly because of failure of the germ cells to migrate into it, or because of some as yet unknown environmental factor (Polani et al. 1954, Grumbach et al. 1955, Lennox 1956, Segal and Nelson 1957). The failure of gonadal differentiation leads to the development of a " neuter " state which, in mammals, appears to be morphologically more closely linked to the female form than to the male. This is confirmed by the well-known female form of the eunuch and by the classical observation of Jost (1953) that rabbits castrated early in intrauterine life develop into morphologically female adults.

Gonadal Agenesis

It is impossible to reconcile the histological appearance of the ovary in the present case with any theory of gonadal agenesis. The gonad, far from remaining as a primitive indifferent genital ridge, has developed into an organ which is an apparently normal infantile ovary containing germ cells. Wilkins (1957) includes in his discussion of Turner's syndrome a group of cases in which a small amount of ovarian germinal tissue is present and to which he gives the name gonadal hypoplasia. Kerkhof and Stolte (1956) described 2 of these cases in adult women, both of whom complained of primary amenorrhœa and were of female habitus with hair growth of female distribution and normal urinary excretion of gonadotrophic hormones. A small biopsy specimen from each ovary showed the typical appearances of gonadal agenesis in one woman, and in the other woman solitary primordial follicles were seen in both ovaries and there were two follicular cysts, the remainder of the tissue consisting of ovarian stroma. Since the 2 patients were clinically similar it was assumed that germ cells had been missed in the biopsy specimen from the first case. In both these cases, however, the nuclear sex was female. A similar case was described by Hoffenberg et al. (1957, case 2), whose patient was exceptional in that she had

had irregular menstruation between the ages of 15 and 21. Sections of her ovaries showed many primordial follicles. The nuclear sex was not determined, but the polymorphonuclear leucocytes were of female type. In these cases the concept of hypogonadism is tenable, but in the present case this hypothesis will not explain the apparent reversal of the genetic sex.

A case which more nearly resembles the present one in the histological appearances of the ovary was described by Atria et al. (1948). It was clinically typical of Turner's syndrome in that the patient was stunted, had webbing of her neck, cubitus valgus, and underdeveloped breasts and pubic hair, and had never menstruated. The level of follicle-stimulating hormone in the urine was raised. At necropsy, at the age of 20, infantile internal genitalia were found: the hypoplastic ovaries each weighed about 2·5 g. and contained many primordial follicles with oogonia. The nuclear sex is not stated. If it was male, the concept of Turner's syndrome as a manifestation of intrauterine gonadal failure would have to be reconsidered.

Klinefelter's Syndrome

The condition of our patient may be regarded as an analogue or mirror image of Klinefelter's syndrome with female nuclear sex (Klinefelter et al. 1942), in which all grades of testicular development, from a simple mass of Leydig cells to a complex tubular system showing spermatogenesis, may be found (Bunge and Bradbury 1956, Segal and Nelson 1957). These two conditions—Klinefelter's syndrome with female nuclear sex, and the syndrome exhibited by the present patient—are instances of complete sex reversal, the genetic sex revealed by examination of the cell nuclei and the phenotypic sex revealed by the bodily habitus and the histological appearance of the gonad being diametrically opposed.

A theory which offers an explanation of this discrepancy has been published by Hoffenberg and Jackson (1957), who postulate the presence of an evocator (itself normally determined by the genetic constitution of the individual), which determines the direction of differentiation of the primitive gonad and thence of the development of the wolffian or müllerian-duct systems. They suggest that, in Klinefelter's syndrome, the male evocator is in the ascendant, and that the gonad is thereby stimulated to develop in the direction of a testis. Such a theory, in reverse, would explain the findings in the present case, and, with the extension that the full effect of a female evocator may not be apparent on the cells of an individual who is genetically male, would explain the embryogenesis of the commoner cases of Turner's syndrome with gonadal agenesis.

True Hermaphroditism

A further possibility which must be mentioned is that the child is a true hermaphrodite having both testes and ovaries or ovotestes. This could not be definitely excluded without serial sections of the whole of both gonads; but we think it extremely unlikely in view of the normal appearance of the ovaries, the perfect development of the müllerian-duct system, and the absence of any identifiable ectopic testicular tissue or wolffian structures.

It will be interesting to see whether this child attains a normal stature and has a normal puberty. Surgical reconstruction of the external genitalia will be carried out later. At present her ovaries are histologically normal for her age; but it is possible that the cells, being of male genetic sex, will be unresponsive to the pituitary hormonal stimulus of puberty. Perhaps such unresponsiveness would explain the condition of the patient described by Atria et al. (1948), although in the absence of knowledge of the nuclear sex this is only speculation. Against such an explanation must be set the fact that one of the patients of Hoffenberg et al. (1957) menstruated despite agenesis of the gonads, as did 2 patients of Polani (1957) with male nuclear sex, in whom, however, laparotomy was not performed.

Summary

A case of anomalous sexual development is described in which the bodily habitus and sexual organs were of female morphology except for enlargement of the clitoris, and the ovaries appeared histologically normal for the age of the patient, but the nuclear sex was male.

The concept of Turner's syndrome is reviewed, and it is concluded that the embryogenesis in the present case can best be explained as due to the ascendancy of an abnormal female evocator acting on the indifferent gonad in the earliest days of intrauterine life; and that failure of development of the gonad may not explain the ætiology of this syndrome.

ADDENDUM

Since this paper was submitted for publication similar cases have been recorded by Prof. R. B. Greenblatt at the 1957 Laurentian Hormone Conference, and by Hoffenberg and Jackson (case 20) (*Brit. med. J.* 1957 ii, 1457).

We wish to thank Dr. R. H. White-Jones, who referred the case, and Miss I. Forshall, F.R.C.S., under whose care the baby was admitted to hospital, for permission to publish, and Dr. E. G. Hall for criticising the manuscript. A summary of this case-report was read at the symposium on Nuclear Sexing held at King's College Hospital, London, on Sept. 6, 1957.

REFERENCES

Armstrong, C. N. (1955) *Brit. med. J.* i, 1173.
Ashley, D. J. B. (1957) *Nature, Lond.* **179**, 969.
Atria, A., Sanz, R., Donoso, S. (1948) *J. clin. Endocrin.* **8**, 397.
Broster, L. R., Patterson, J., Camber, B. (1953) *Brit. med. J.* ii, 1288.
Bunge, R. G., Bradbury, J. T. (1956) *J. Urol*, **76**, 758.
Davidson, W. M., Smith, D. R. (1954) *Brit. med. J.* ii, 6.
Gordan, G. S., Overstreet, E. W., Traut, H. F., Winch, G. A. (1955) *J. clin. Endocrin.* **15**, 1.
Greenblatt, R. B. (1957) Personal communication.
Grumbach, M. M., Van Wyk, J. J., Wilkins, L. (1955) *J. clin. Endocrin.* **15**, 1161.
Hoffenberg, R., Jackson, W. P. U. (1957) *ibid.* **17**, 454.
— — Muller, W. H. (1957) *ibid.* p. 902.
Jost, A. (1953) *Recent Progr. Hormone Res.* **8**, 379.
Kerkhof, A. M., Stolte, L. A. M. (1956) *Acta endocrin., Copenhagen*, **21**, 106.
Klinefelter, H. F., Jr., Reifenstein, E. C., Jr., Albright, F. (1942) *J. clin. Endocrin.* **2**, 615.
Lennox, B. (1956) *Scot. med. J.* **1**, 97.
Moore, K. L., Barr, M. L. (1955) *Lancet*, ii, 57.
— Graham, M. A., Barr, M. L. (1953) *Surg. Gynec. Obstet.* **96**, 641.
Polani, P. E. (1957) Personal communication.
— Hunter, W. F., Lennox, B. (1954) *Lancet*, ii, 120.
— Lessof, M. H., Bishop, P. M. F. (1956) *ibid.* ii, 118.
Segal, S. J., Nelson, W. O. (1957) *J. clin. Endocrin.* **17**, 676.
Wilkins, L. (1957) The Diagnosis and Treatment of Endocrine Disorders in Childhood and Adolescence. Oxford.
— Fleischmann, W. (1944) *J. clin. Endocrin.* **4**, 357.
— Grumbach, M. M., Van Wyk, J. J., Shepard, T. H., Papadatos, C. (1955) *Pediatrics*, **16**, 287.

INTRATHECAL PHENOL FOR INTRACTABLE PAIN:

SAFETY AND DANGERS OF THE METHOD

P. W. NATHAN
M.D. Lond., M.R.C.P.
MEMBER OF THE NEUROLOGICAL RESEARCH UNIT OF THE MEDICAL RESEARCH COUNCIL

T. G. SCOTT
M.B. Lond.
REGISTRAR, DEPARTMENT OF CLINICAL PATHOLOGY
NATIONAL HOSPITAL, QUEEN SQUARE, LONDON, W.C.1

AT the back of the minds of those who treat patients with intractable pain, there is always the hope that a substance may be found which will destroy the nerve-fibres conducting impulses subserving the sensation of pain, while leaving intact all other fibres. With such a substance, a selective chemical posterior rhizotomy might be carried out by intrathecal injection. It was, then, with much interest that we heard that Maher was treating the severe pain of cancer by the intrathecal injection of substances thought to unite with nervous tissue.

In 1955 Maher published his first results of treating pain in cancer by the intrathecal injection of phenol in glycerin and of silver nitrate in water and glycerin ; in 1957 he reported further results, using phenol dissolved in glycerin and ethyl iodophenylundecylate (' Myodil '), and silver nitrate in a solution of phenol in glycerin.

These solutions were injected with the patient lying in such a position as to allow the solutions, which are heavier than cerebrospinal fluid (C.S.F.), to flow into the arachnoid sac surrounding the selected nerve-roots. When given in this manner, the full concentration of the solution falls on about two roots, with little or no effect on neighbouring roots. Maher noted that the substances affected the function of the nerve-roots within a few minutes and that the maximal effect passes off within 10 to 15 minutes. The patient, after lying in the required position for a quarter of an hour, can then move into a sitting position, without any further manifestations of the action of the substances on the nerve-roots.

Anyone hearing of this method of dealing with intractable pain will want to know if it is effective and if it is free from danger. We report here an investigation of the toxicity of phenol in myodil and of silver nitrate in phenol and glycerin, injected intrathecally in quantities of 1 ml. or less. We are not reporting our results obtained in relieving pain—suffice it to say that we have obtained relief in about a half of the cases—nor are we now reporting our investigation of the mode of action of phenol on nerve fibres. Although we have so far had the opportunity of testing Maher's method in only a few cases, our limited experience may be useful to others who have the problem of helping patients with intractable pain.

Undesired side-effects are seen with most methods used in the treatment of the chronic pain of cancer. Analgesic drugs often cause nausea, light-headedness, and drowsiness ; anterolateral cordotomy has complications such as disturbed bladder control ; and leucotomy may give rise to defects of judgment, initiative, and intellectual capacity. Intrathecal injections might result in a reactive meningitis or arachnoiditis, in paraplegia, or in damage to nerve-fibres which should be preserved. Changes in C.S.F. cell and protein contents have been looked for as a possible indication of damage to and reaction of the surrounding tissues, and in particular of the meninges. The rate of diffusion of phenol out of myodil into the C.S.F. has been studied, for it is likely that the toxic effects of phenol occur when its concentration in the C.S.F. rises above a certain level.

In all but a few cases reported here the phenol in myodil has been a 7·5% solution ; in the remainder it has been a 5% solution. We report only the results of injecting the stronger solution, for if such a solution may be used with impunity, then the weaker solution is likely to be innocuous. The 7·5% solution of phenol in myodil was given in amounts of 0·75, 1·0, or 1·5 ml. The silver nitrate could not be given in watery solution, for then some of the phenol would be present in watery solution, and it is essential that the phenol should remain in solution in a lipid. Accordingly the silver nitrate was dissolved in as small a quantity of water as possible, and this small quantity of solution was added to a 5% solution of phenol in glycerin ; 0·75 ml. of this solution was injected. These solutions were injected intrathecally caudal to the 12th thoracic vertebra in all cases, except in three, in which the injections were made immediately caudal or cranial to the 7th cervical vertebra.

Observations

Evidence of Undesired Side-effects

Phenol in myodil.—Thirty injections of phenol in myodil have been given.

In no case has any weakness of the musculature followed the injection, even when invasion of the peripheral nerves by cancerous tissue had already caused some weakness. After one of the injections, the patient had retention of urine and such diminution in anal sensation that he did not know when fæces were being passed ; this patient had had a very slight disorder of defæcation before the injection, due to infiltration of the pudendal nerves by a cancer originating in the rectum. Following the other twenty-nine injections, micturition and defæcation were unaffected.

Silver nitrate in phenol in glycerin has been injected in thirteen cases.

There was a slight increase in weakness of an already affected limb in six, an increase in an already disturbed control of micturition in two cases, and an increase in an already disturbed control of defæcation in one. In one patient, who had a carcinoma of the breast with metastases, anæmia, and diabetes mellitus, the injection was followed by a severe meningeal reaction. 2 days after the injection the patient died. Since this experience no further injections with silver nitrate have been carried out.

Necropsy Evidence of Toxicity

Phenol in myodil.—As seven of the patients who had this injection have eventually died from cancer, it has been possible to determine changes brought about by the injection. In none was there any macroscopic abnormality which could be attributed to the injection.

There was no fibrosis outside or inside the spinal theca ; the meninges were not thickened and the pia mater and arachnoid membrane were of normal appearance. The nerve-roots appeared normal, in so far as they were not involved by the cancerous tissue; they were neither bound down by adhesions nor thickened nor shrivelled.

The histological investigation of the nerve-roots from these cases and from cats treated in the same way is being undertaken by Dr. Marion Smith ; the results of this investigation will be reported later.

Silver nitrate in phenol in glycerin.—Five of the seven patients mentioned in the previous paragraph, showing no gross abnormality attributable to the injections, had also had injections of the silver nitrate solution.

However, as has been said already, in one patient a marked meningeal reaction developed after an intrathecal injection given in the lower cervical region. In this case leptomeningitis was found at necropsy; this was most intense caudal to the 8th cervical vertebra, where the injection had been given. The reaction involved the whole of the pial sac. It was greatest in the lower thoracic region and more evident posteriorly than anteriorly. This distribution was probably due to the position —half sitting up—in which the patient had been nursed after the injection.

Evidence of Toxicity as Judged by Changes in Cerebrospinal-fluid Constituents

Phenol in myodil.—In nine patients specimens of C.S.F. were taken and examined after the intrathecal injection (table I).

In eight patients the cells were counted and the protein estimated both before and after the injection ; in one, no specimen was taken before the injection. The specimens were taken at various intervals after the injection. There were few consistent changes. In one patient there was definite slight polymorphonuclear leucocytosis in the fluid 24 hours after the first injection, but it did not recur 24 hours after a second injection. In these nine patients the maximal effects were a polymorphonuclear leucocytosis of 73 per c.mm. 24 hours after an injection, and an increase in protein content from 90 mg. per 100 ml. to 140 mg. in 5 days; and the minimal

TABLE I—CHANGES IN C.S.F. CONSTITUENTS FOLLOWING INJECTION OF 7½% PHENOL IN MYODIL 0·75–1·0 ML.

Patient no.	Before injection			After injection													
				¼–½ hr.			1 hr.			6–24 hr.			24–36 hr.			2–8 days	
	P	L	Prot.	P	L	Prot.	P	L	Prot.	P	L	Prot.	P	L	Prot.	P	L	Prot.
1. 1st injection ..	0	0	30										73	1	75		
2nd injection ..	73	1	75							25	3	40					
2.	0	1	35	0	0	35				4	3	60					
3.	0	1	35	0	1	35	0	1	45								
4. 1st injection ..	0	2	90	0	1	90										2	9	100
2nd injection ..				2	10	110				2	11	110	1	8	110			
5. 1st injection ..	0	1	35	0	0	50										0	1	30
2nd injection ..	0	1	30	0	1	30												
6.	0	7	90													0	5	140
7.	0	0	80													0	1	90
8.																0	12	40
9.	0	4	90	0	0	90										0	0	95

P—Polymorphonuclear leucocytes (per c.mm.) ; L—Lymphocytes (per c.mm.) ; Prot.—Protein (mg. per 100 ml.).

effects were no change in the cell count and an increase in protein from 90 mg. to 95 mg. per 100 ml. in 5 days. These changes, however, may be regarded as very slight.

Silver nitrate in phenol in glycerin.—In very few patients was the C.S.F. examined after the injection of silver nitrate 0·81 mg. (gr. $^1/_{80}$) dissolved in water and added to a solution of phenol in glycerin). The findings in these specimens are given in table II. Apart from the death from chemical meningitis, the results do not suggest that this form of injection is very toxic.

Rate of Diffusion of Phenol out of Myodil into C.S.F.

Phenol acts on tissues differently according to whether the solvent is water or a lipid. As the phenol injected into the C.S.F. in myodil or glycerin is immediately surrounded by an aqueous fluid, it is important to know its rate of diffusion into the C.S.F. It is evident that the amount diffusing into the C.S.F. produces no marked reaction; for the changes in the cellular and protein constituents of the fluid are slight.

In the first instance observations were made on the diffusion of phenol into C.S.F. in vitro. Later, the diffusion in patients was determined by taking specimens at intervals after the intrathecal injection.

The *method of estimating phenol* was similar in the in-vitro and in-vivo experiments. For the estimation in the in-vivo experiments, 1 ml. of C.S.F. was added to 4·5 ml. of Folin and Ciocalteau's reagent diluted 1 : 3 with water. The precipitated proteins were centrifuged, and to 5 ml. of the supernatant fluid was added 2·5 ml. of 20% sodium carbonate solution (w/v). The tube was placed for 5 minutes in a waterbath at 37°C to bring up the blue colour ; this was compared with that of a standard solution containing 0·1 mg. of phenol, which had been treated similarly. In the in-vitro experiments it was found that the C.S.F. contained so much phenol that it was necessary to dilute it with distilled water before the estimation of the phenol. The amount of dilution necessary to give a satisfactory final colour was found by trial and error. As a result of this dilution, it was found unnecessary to centrifuge the specimen after the addition of dilute Folin and Ciocalteau's reagent, for the protein had been " diluted out ". Generally, a 1 in 10 dilution was found to be most satisfactory. 1 ml. of this was added to 3 ml. of water in a test-tube, followed by 3 ml. of dilute Folin and Ciocalteau's reagent and then by 2·5 ml. of the sodium carbonate solution. A standard was prepared in the same way, using 0·1 mg. of phenol in 1 ml., and the colours developed were compared.

TABLE II—CHANGES IN C.S.F. CONSTITUENTS FOLLOWING INJECTION OF 5% PHENOL IN MYODIL 0·75 ML. CONTAINING 0·81 MG. OF SILVER NITRATE PER ML.

Patient no.	Before injection			After injection											
				½–1 hr.			24–48 hr.			1 week			1–2 weeks		
	P	L	Prot.	P	L	Prot	P	L	Prot.	P	L	Prot.	P	L	Prot.
5	0	0	40										0	1	180
7	0	1	90							2	2	220	1	3	120
8	0	0	90							0	3	105			
9	0	0	95	0	0	110									
10							3000	100	1800						

Procedure of in-vitro experiments.—25 ml. of normal C.S.F. was layered carefully on top of 3 ml. of 10% phenol in myodil in a 50-ml. measuring cylinder. To prevent turbulent mixing of the two liquids, the C.S.F. was delivered upwards by means of a pipette, the end of which had been made J-shaped. The fluid was covered with a layer of liquid paraffin to avoid evaporation of phenol. The measuring cylinder was then incubated at 37°C for 22 hours.

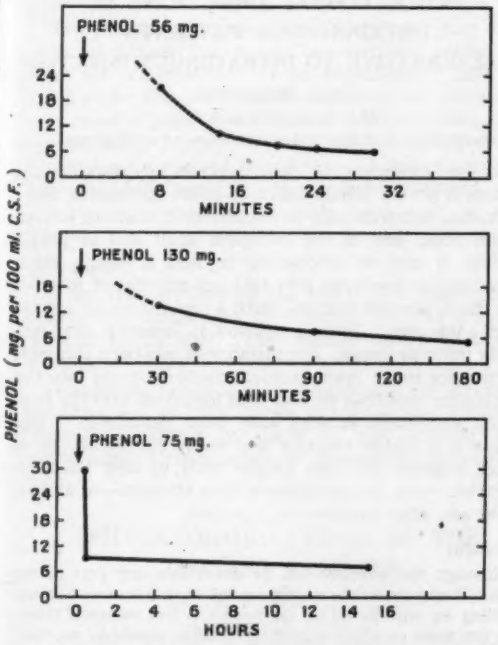
At intervals of $^1/_2$, $1^1/_2$, $3^1/_2$, $6^1/_2$, and 22 hours, 1 ml. of C.S.F. was slowly removed from the centre of the column, and its phenol content was estimated. The concentration of the phenol at the centre of the fluid column was taken as representative of that of the whole column, on the assumption that the phenol diffusion gradient was linear.

TABLE III—RATE OF DIFFUSION OF PHENOL FROM MYODIL INTO C.S.F. IN VITRO

Times from start of experiment at which specimens were taken (hr.)	Percentage of phenol transferred from myodil into C.S.F.
$^1/_2$	4·0
$1^1/_2$	9·3
$3^1/_2$	14·7
$6^1/_2$	25·5
22	32·1

Results of in-vitro experiments.—The results of a typical experiment are presented in table III. In the actual experiment reported, the surface area of the liquid interface in the graduated cylinder was 6·2 sq. cm. ; the calculated rate of diffusion was 4·5 mg. per sq. cm. in the first $1^1/_2$ hours. At first there was a rapid diffusion of phenol out of the myodil ; as the concentration in the supernatant C.S.F. rose, the diffusion took place more slowly.

Procedure of in-vivo experiments.—In fourteen patients, the local concentration of phenol in the C.S.F. was estimated. It was assumed that there was no phenol in the C.S.F. before the injection ; the amount of phenol in body fluid is known not to exceed about 0·5 mg. per 100 ml.—an amount considered insignificant in relation to that injected. The specimens of C.S.F. were taken either through the needle by which the injection had been made (but only after C.S.F. had been allowed to flow through the needle to wash out all traces of the myodil solution) or through another needle one vertebral space caudally. When the fluid was withdrawn at intervals up to 35 minutes after the injection, the patient was not moved from



Graphs to illustrate the rate of diffusion of phenol out of myodil into the local C.S.F. in 3 of the patients.

the lateral position. When the fluid was withdrawn at intervals of hours or days after the injection, the patient was allowed to move about normally.

For the first 24 hours after an injection, however, the patient was kept in a sitting or semi-sitting position, to prevent the phenol in myodil from flowing rostrally into the cranial cavity. After that time he was allowed up and no restrictions were placed on his walking about. The specimens of fluid then taken were local to the site of the injection. When a patient lies in the lateral position, myodil, being heavier than C.S.F., spreads locally for about the depth of a vertebra in each direction from the point of the injection. After the patient has been sitting or standing, the myodil collects at the bottom of the thecal sac, as shown by X-ray examination ; in this case the myodil is caudal to the point of the needle through which the sample is being taken.

Results of in-vivo experiments.—The rates of diffusion of the phenol out of myodil into the local C.S.F. are shown graphically in the figure ; each curve gives the findings in a different patient. All other results were similar to these examples. It is apparent from the figure that the phenol content of the C.S.F. in the immediate neighbourhood of the injection was relatively high soon after the injection ; it fell considerably within the 1st hour ; after the 1st hour, and during the subsequent days, the fall was only very slight. In every case the initial phenol content of the C.S.F. was always the highest.

Although in the in-vitro experiments the amount of phenol transferred to the C.S.F. continued to rise during the first 24 hours after the injection, such diffusion was not found in the in-vivo experiments. There may be several reasons for this. The phenol is taken up by nervous and other tissue ; the C.S.F. surrounding the phenol in myodil is constantly flowing, so that fluid with a relatively high phenol content is removed or diluted by uncontaminated C.S.F. It is seen radiologically that the myodil containing phenol breaks up into droplets to some extent, thereby increasing the interface between the myodil and the C.S.F. and permitting more rapid diffusion. And it is possible that phenol may be removed from the C.S.F. into the vascular bed.

The effects of phenol on nervous conduction are manifest $1^1/_2$ to 2 minutes after the injection, rising to their maximum within $^1/_2$ minute, and tending to pass off in 10 minutes. From the physiological effect it would appear that the amount of phenol leaving the myodil, and eventually being fixed in the nervous tissue, must be great within the first 5 minutes. This rapid transfer is not apparent in the figure ; the fall alone is shown on the graphs. We do not know what content of phenol in watery solution is needed to block nerve-fibres. The reason why the patient can be moved within 15 minutes of the injection is probably that the concentration of phenol in watery solution is then too small to affect the nerve fibres ; by that time the phenol has been taken up by the nervous and other tissues, and an appreciable quantity has passed into the C.S.F. In some cases no therapeutic effect, and even no local anæsthetic effect, was obtained. It is apparent from the manner in which the phenol leaves the myodil that if there is no effect within the first few minutes, there will be none subsequently ; and that in fact is what has always been found.

Discussion

In view of our experience, intrathecal injection of silver nitrate in phenol and glycerin seems to be dangerous, when performed in the cervical region. The intrathecal injection of phenol in myodil in the concentration used is safe; and we consider that this method is worthy of trial before surgical division of sensory pathways is undertaken.

It is 90 years since Lister introduced phenol as an antiseptic into medicine. Experience has shown that phenol is toxic ; and so it comes as a surprise to hear that it can be injected intrathecally in fairly strong solution.

The effect of phenol on tissues and organisms varies according to the solvent used. In watery solution phenol is penetrating and sclerosing; it is well known to all practising doctors that phenol in glycerin, appropriately used, is harmless. Equal quantities of pure phenol and pure camphor have been used in the treatment of tinea. In this form, phenol is still antiseptic and analgesic, but it is far less caustic. However, observations of the effect of phenol on the skin have little bearing on the possible effects of phenol within the thecal sac, surrounded by C.S.F. and in contact with nervous tissue.

To the best of our knowledge, toxic effects have been seen only when the phenol was used in watery solution. Evidence of damage to the nervous system is scanty.

Greenfield et al. (1955) concluded that phenol, "if introduced in considerable concentration (0·5%) would be expected to lead to immediate lesions of the roots of the cauda equina with a corresponding symptomatology" ; this refers only to phenol in watery solution (Greenfield, personal communication, 1956).

Weston Hurst (1955) reported the results of an investigation in monkeys of certain substances which might be expected, when introduced intrathecally, to cause damage to the nervous system from arachnoiditis ; one monkey which received intra-

thecally phenol (as a watery 2% solution) died after 13 days with greatly dilated ventricles. On the other hand large amounts of a dilute watery solution of phenol have been administered intrathecally to humans without causing death. Suvansa (1931) reported that he had treated tetanus by giving intrathecally 0·25% solutions of phenol in water in doses of 30–40 ml. to adults and 12–20 ml. to children. This treatment brought the patients successfully through the period of hyperexcitability of the central nervous system, but caused nephritis.

A legal case was brought in 1953 against the Ministry of Health and Messrs. Ciba. It was claimed that the small amount of a 5% solution of phenol in water that might have leaked through a hypothetical and invisible crack in an ampoule of cinchocaine (' Nupercaine ') was sufficient to cause severe arachnoiditis and consequent paraplegia ; and this claim was regarded as established. It is well known to neurologists that severe meningeal reactions causing paraplegia sometimes follow spinal anæsthesia ; such cases have been reported by Zeckel and Behr (1933), Kennedy et al. (1945), Kennedy et al. (1950), Macken and Martin (1950), and Greenfield et al. (1955).

Although we have emphasised that, with this method of treating intractable pain, the phenol is in lipid solution, we have shown that the phenol diffuses into the C.S.F., resulting in the presence of a watery solution of phenol within the spinal canal. However, with the amounts and concentrations used so far—recently up to 1 ml. of an 8% solution or 3 ml. of a 7·5% solution—undesired pathological effects have not followed. More severe meningeal reactions often follow air encephalography, which is a well-established diagnostic procedure. We conclude that the injection of phenol in myodil for the relief of pain, especially the pain of cancer, appears to be justified.

Summary

An investigation is reported of the toxic effects of phenol in ' Myodil ' and of silver nitrate dissolved in phenol in glycerin, injected intrathecally as a treatment for intractable pain.

The toxic effects are considered under the categories of undesired clinical effects, evidence of toxic effects found post mortem, and changes in the cerebrospinal fluid.

As phenol is relatively non-toxic in lipid solution and relatively toxic in watery solution, the rate of diffusion was investigated of phenol out of lipid solution into the C.S.F.

It is concluded that at least 1 ml. of a 7·5% solution of phenol in myodil can safely be injected intrathecally. The solution of silver nitrate in phenol in glycerin is less safe than the phenol in myodil.

We should like to thank Dr. E. A. Carmichael and Dr. J. N. Cumings, who provided us with opportunities and encouragement to carry out this investigation, and the physicians and surgeons at the National Hospital and Mr. I. R. McCaul of the Whittington Hospital, who so kindly referred patients to one of us (P. W. N.).

REFERENCES

Greenfield, J. G., Rickards, A. G., Manning, G. B. (1955) *J. Path. Bact.* **69**, 93.
Hurst, E. W. (1955) *ibid.* **70**, 167.
Kennedy, F., Somberg, H. M., Goldberg, B. R. (1945) *J. Amer. med. Ass.* **129**, 664.
— Effron, A. S., Perry, G. (1950) *Surg. Gynec. Obstet.* **91**, 385.
Macken, J., Martin, F. (1950) *Mschr. Psychiat. Neurol.* **119**, 129.
Maher, R. M. (1955) *Lancet*, i, 18.
— (1957) *ibid.* i, 16.
Suvansa, S. (1931) *ibid.* i, 1075.
Zeckel, A., Behr, E. (1933) *Psychiat. neurol. Bl., Amst.* **37**, 57.

INTRAGLOSSAL INJECTIONS IN UNCONSCIOUS PATIENTS

AN ALTERNATIVE TO INTRAVENOUS INJECTION

JOHN BULLOUGH
M.B. Lond., F.F.A. R.C.S.
CONSULTANT ANÆSTHETIST, DARTFORD GROUP OF HOSPITALS

IN the treatment of unconscious or anæsthetised patients it is very often desired to inject stimulants, antidotes, &c., intravenously to ensure rapid onset of action. In the obese and in the collapsed adult and in young children it may be impossible to find a vein. Since intramuscular injections may take ten minutes or more to take effect, another method, with a rapid onset of action, is an advantage. Such a method is injection into any highly vascular organ. For instance, it has been common practice for many years to inject oxytocic drugs into the uterus after cæsarean section (and injections into the liver during abdominal surgery have been described). The tongue is a highly vascular and easily accessible organ. Drugs injected into the tongue start to take effect in 40–80 sec.—e.g., the tachycardia after atropine—as against 15–30 sec. after intravenous injection.

Technique

Although the injection can be made into any part of the tongue, I now insert the needle via the ventral surface because bleeding on withdrawal of the needle is less common there. The two veins on either side of the midline should be avoided. With the patient lying supine the tip of his tongue is picked up in a gauze swab between the index finger and thumb of the left hand and drawn out of the patient's mouth. The syringe is held in the right hand, and the needle is inserted directly posteriorly (vertically downwards). Volumes of up to 2 ml. may be injected. Provided a sharp needle, size 16–18, is used, bleeding is uncommon on withdrawal of the needle. Anæsthetists may prefer to lift the tongue forward with a pair of Magill's forceps, or any other pair of blunt forceps will do. In anæsthetised patients the needle may be left in situ for serial injections of analgesics, &c.

Indications

Emergencies.—In the treatment of any unconscious, comatose, or collapsed patient, whether from injury, disease, or drugs, where a rapid onset of action is necessary, this method can be used with advantage.

In anæsthetic practice.—The intraglossal route may be used for most of the drugs used—relaxants and their antagonists, analgesics and their antagonists, hypotensive drugs and vasopressors, procaine derivatives and so on. Irritating solutions mentioned below should be avoided.

Special mention should be made of suxamethonium (' Scoline,' · Brevidil,' ' Anectine '). I give this drug intraglossally in double the dosage I would have used intravenously —e.g., 100 mg. for an adult. Paralysis usually develops 90 sec. later, depending on the vascular condition of the patient, being most rapid in healthy children, when it may start in 45 sec. Muscular fibrillations are usually absent or minimal. The effect wears off more gradually but in much the same time as after intravenous injection. A flush around the face and neck may sometimes follow for a short time.

Contraindications

Any solution known to be irritating should be avoided, except perhaps as a life-saving measure. Barbiturates should not be used; nor should solutions of tubocurarine and of phenothiazine derivatives, because a tender lump as big as a pea is left for a week or so. Dimethyltubocurarine iodide, being in aqueous solution, can be used as an alternative to tubocurarine, and gallamine can be used. Pethidine, nalorphine, atropine, and neostigmine can all be used.

Conclusion

The practice of injecting into the tongue may at first seem unæsthetic but it can be extremely useful when veins are inaccessible. As an anæsthetist I have been using it for five years without mishap, and recommend it to general practitioners and anæsthetists alike. As a general guide it may be safely said that any solution which can be injected hypodermically without irritation can safely be injected into the tongue. It should not be practised in conscious patients, because it is rather painful.

Summary

When veins are inaccessible, and a rapid onset of action is required, drugs may be injected into the tongue in unconscious patients. The onset of action takes 45–90 seconds.

Intraglossal injection is recommended for stimulants, antidotes, &c., in emergencies and in clinical anæsthesia. Particular mention is made of the relaxant suxamethonium. Irritant solutions should not ordinarily be used.

PHÆOCHROMOCYTOMA OF THE URINARY BLADDER

B. R. B. LUMB
M.B. St.And., M.R.C.P.
MEDICAL REGISTRAR, ADDENBROOKE'S HOSPITAL, CAMBRIDGE

G. A. GRESHAM
M.A., M.D. Cantab.
DEMONSTRATOR IN PATHOLOGY IN THE UNIVERSITY OF CAMBRIDGE

THIS is an account of a phæochromocytoma arising in the wall of the urinary bladder. Similar cases have been recorded only twice (Zimmerman et al. 1953, Pugh 1956). The tumour produced pressor amines and gave rise to a striking clinical picture which should be easily recognised if met again. The scanty literature gives a false impression of the rarity of the tumour; we hope later to report several examples collected from British hospitals.

Case-report

The patient is a married woman, aged 48. At the age of 13 she began to have curious attacks after micturition. As soon as the bladder was emptied, she experienced forcible "thumping" of the heart, a throbbing "bursting" headache, intense pallor of face and hands, coldness of the fingers and usually sweating. These attacks, which lasted for only a few minutes, took place only in summer, and they ceased with the menarche, at 15. But they reappeared in 1950, when she was 41, and were again confined to the summer months, occurring about five times a week. They became more frequent and more severe until, in 1953, they followed every act of micturition and lasted about an hour and a half.

She was admitted to a nursing-home in October, 1953, for observation but had no attacks. She was admitted to hospital in January, 1954, for investigation. Her blood-pressure varied from 160/100 to 230/110 mm. Hg, and her basal metabolic rate (B.M.R.) was +33%. Intravenous phentolamine hydrochloride ('Rogitine') 5 mg. produced a fall of blood-pressure from 190/100 to 170/85 mm. Hg in one minute; this result was considered equivocal. Renal-function tests and an intravenous pyelogram were normal, as were the electrocardiogram and chest radiograph. A diagnosis of paroxysmal tachycardia, occurring in a patient with hypertension and mild thyrotoxicosis, was thought likely. She was given 100 mg. of methyl thiouracil daily together with phenobarbitone gr. $^1/_8$ t.d.s., discharged from hospital, and observed as an outpatient.

Attacks occurred in the summer of 1954 but seemed to be less frequent and lasted only a few minutes. Blood-pressure readings varied from 190/100 to 220/110 mm. Hg. Treatment with methyl thiouracil and phenobarbitone was continued, and occasional mild attacks occurred in the summer of 1955; the blood-pressure remained about 200/100. Methyl thiouracil medication was reduced to 50 mg. daily in March, 1956, and withdrawn altogether four months later; phenobarbitone was continued. Although during 1956 blood-pressure readings were rather higher—250/110–270/150—the symptoms disappeared entirely from April onwards. There was no radiological or electrocardiographic evidence of cardiac hypertrophy; the ocular fundi showed variation in arterial calibre, with venous nipping but no hæmorrhages or exudates and no papilloedema. The patient was leading a busy life, which included a large daily newspaper round in a country district.

In July, 1951, a sample of urine was tested for pressor amines at University College Hospital, London, by the cat blood-pressure method (Moulton and Willoughby 1955). It was found to contain 0·8 mg. of noradrenaline per ml., indicating the presence of a phæochromocytoma. Intravenous pyelography was repeated in an attempt to locate the neoplasm: there was no displacement of the kidneys, and the renal pelves and ureters were normal; an indentation in the vault of the bladder was attributed to pressure from uterus or distended bowel. Tomograms of the renal areas were normal. No further investigations were made, and she continued to attend as an outpatient, remaining free from symptoms until January, 1957, when a bout of hæmaturia, lasting ten days, led to readmission and cystoscopy.

A smooth tumour, with a broad base, was seen in the posterior bladder wall above the trigone. It was considered likely to be the phæochromocytoma, and the decision was made to remove it, controlling the blood-pressure with phentolamine and noradrenaline (Helps et al. 1955).

Laparotomy was done on Feb. 26, 1957, and the tumour excised from the posterior bladder wall without difficulty. Both adrenals were normal, and no other neoplasm was found in the abdomen. The blood-pressure, measured every half to two minutes throughout the operation, varied from 120/80 to 270/170 mm. Hg (fig. 1). Phentolamine was given intravenously in doses of 5 mg. up to a total of 15 mg. On ligation of the last vein draining the tumour the blood-pressure fell to 100/80, and an intravenous infusion of noradrenaline was started; it was adjusted to maintain the blood-pressure at about 170/110 for the remainder of the operation. The infusion was stopped three hours later, and the blood-pressure remained at about 115/75 mm. Hg for the next twelve hours. Next day it was 140/90 and it remained at, or near, this level until the patient was discharged from hospital five weeks later. Her urine, examined during convalescence, contained 0·01 mg. of noradrenaline per ml. The B.M.R. was +6%.

She was seen several times as an outpatient in the next six months. She remains free from symptoms and looks very well. Her blood-pressure varies from 190/100 to 210/105 mm. Hg and her ocular fundi show variation in arterial calibre as the only abnormality. When last seen she remarked that she could never have got through the recent hot weather without her operation.

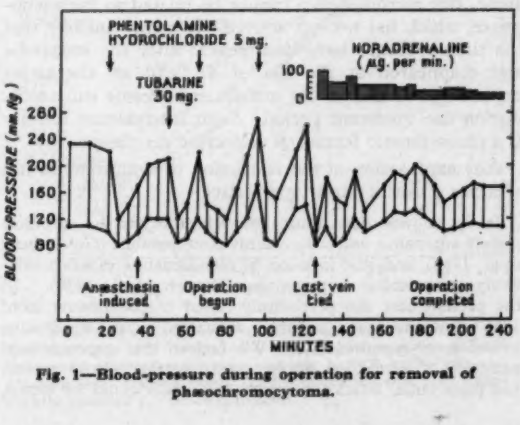


Fig. 1—Blood-pressure during operation for removal of phæochromocytoma.

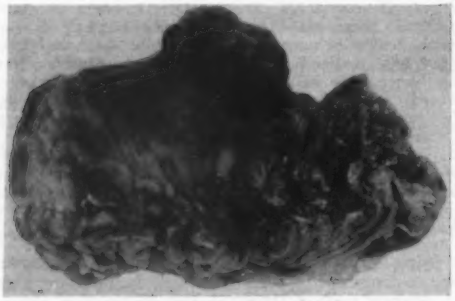


Fig. 2—Operation specimen showing a cluster of nodules on one aspect of the tumour. (Actual size.)

PATHOLOGY

The specimen was a roughly ovoid brown-red mass measuring 13×8×8 cm. and weighing 74 g. The greater part of the surface was smooth and shining, apart from a small gelatinous translucent area 2 cm. in diameter. A cluster of small nodules (up to 1 cm. in diameter) projected from the mucosal surface (fig. 2). The cut surface of the specimen showed yellow and red patches; it turned deep brown after a few hours' immersion in 10% formol saline solution. The fixative became brown after a few days—a characteristic feature of phæochromocytoma.

An unfixed piece of the tumour examined for pressor amines contained 2·3 mg. of adrenaline and noradrenaline per gramme.

Histological examination revealed trabeculæ and solid acini consisting of polygonal cells. The cells contained delicate cytoplasmic granules and showed occasional nuclear pleomorphism. Capillaries were abundant throughout the tumour. The chromaffin reaction was not obtained. Histochemical examination of the tumour cells showed lipid and protein in the cytoplasmic granules.

The tumour lay outside the muscle coat of the bladder but was not clearly demarcated from it. A few small islands of tumour cells infiltrated between muscle bundles. Arterioles showed conspicuous intimal fibrous thickening.

The close relationship of tumour cells to abundant capillaries provided the main clue to its endocrine origin. However, without the results of biochemical investigations it is doubtful whether the neoplasm could have been recognised as a phæochromocytoma.

Discussion

The clinical history and demonstration of pressor substances in the urine and in the tumour leave little doubt that the attacks both in childhood and middle life were due to squeezing of the growth by contraction of the bladder muscles. Quiescence coincided with the menarche, but recrudescence cannot be related to the menopause, which has not yet arrived. It seems unlikely that the tumour could have disappeared after the menarche and reappeared at the age of 41, and an alternative explanation is that it did not secrete pressor substances during the quiescent period. Such intermittent activity is a characteristic feature of endocrine neoplasms.

Any explanation of the restriction of symptoms to hot weather must be purely speculative.

It is known that some phæochromocytomata produce mainly adrenaline and some mainly noradrenaline (Goldenberg et al. 1954), and that infusion of noradrenaline causes a relatively symptomless hypertension (Barnett et al. 1950). In the present case the persistently raised blood-pressure from 1953 onwards was probably associated with continuous secretion of noradrenaline. We believe that superimposed secretion of adrenaline during warm weather would explain the paroxysmal attacks, a hypothesis which could be tested, in a future case, by differential estimation of the two substances in the urine by the method suggested by McMillan (1957).

The problem, then, is to account for production of adrenaline during the summer. A possible clue is provided by Folkow and Von Euler (1954), who showed that stimulation of certain parts of the hypothalamus in the cat caused the suprarenal glands to secrete mainly adrenaline, whereas stimulation of other hypothalamic areas led to a secretion consisting mainly of noradrenaline. It is not known whether human phæochromocytomata are subject to the same hypothalamic influences as the feline suprarenal medulla, but it is an interesting hypothesis. If such hypothalamic control exists it could explain the postulated variation in secretion of pressor substances in the present case. The intimate relationship of the temperature-regulating and sympathetic centres of the hypothalamus suggests that the activities of the one might influence those of the other. Some such explanation might explain the restriction of this patient's attacks to warm weather.

It is impossible to assess the significance of the apparently beneficial effect of methyl-thiouracil therapy. The raised B.M.R. in patients with phæochromocytoma is probably due to increased oxidation in the tissues, brought about by excess of catechol amines and not of thyroid hormone. The normal B.M.R. and normal urinary excretion of adrenaline and noradrenaline, after excision of the tumour, accord with this view.

The blood-pressure remains moderately raised several months after removal of the tumour, a common finding in these cases (Peart 1954). The condition resembles essential hypertension, and its significance has been discussed by Goldenberg et al. (1948) and Pickering (1955). This fixed hypertension was probably already present when the phentolamine test was made in 1954 and would explain the equivocal response.

The structure of the tumour was not sufficiently characteristic to permit a diagnosis on histological grounds alone, and we regard its high adrenaline/noradrenaline content as much more convincing evidence of its nature. The fickle chromaffin reaction is an unreliable criterion.

Summary

A case is described in which a phæochromocytoma arose in the wall of the urinary bladder. It produced pressor amines, which were detected in the urine and gave rise to characteristic paroxysmal attacks after micturition. The attacks were confined to warm weather; the significance of this remarkable feature is discussed. Since the histological features of such tumours are not always characteristic, the importance of estimating pressor amines in the tumour is emphasised.

Our thanks are due to Dr. Leslie Cole for permission to publish, to Mr J. F. R. Withycombe, who performed the operation, to Dr. A. M. Barrett for his advice, and Dr. N. R. Lawrie for the biochemical estimations.

REFERENCES

Barnett, A. J., Blacket, R. B., Depoorter, A. E., Sanderson, P. H., Wilson, G. M. (1950) *Clin. Sci.* **9**, 151.
Folkow, B., Von Euler, U. S. (1954) *Circulation Res.* **2**, 191.
Goldenberg, M., Pines, K. L., Baldwin, E. deF., Green, D. G., Roh, C. E. (1948) *Amer. J. Med.* **5**, 792.
— Serlin, I., Edwards, T., Rapport, M. M. (1954) *ibid.* **16**, 310.
Helps, E. P. W., Robinson, K. C., Ross, E. J. (1955) *Lancet*, ii, 267.
McMillan, M. (1957) *ibid.* i, 715.
Moulton, R., Willoughby, D. A. (1955) *ibid.* ii, 16.
Peart, W. S. (1954) *in* Ciba Foundation Symposium on Hypertension; p. 104. London.
Pickering, G. W. (1955) High Blood Pressure, p. 410. London.
Pugh, R. C. B. (1956) *Proc. R. Soc. Med.* **49**, 710.
Zimmerman, I. J., Biron, R. E., MacMahon, H. E. (1953) *New Engl. J. Med.* **249**, 25.

Preliminary Communication

A THEORY OF NERVE DEAFNESS

THREE types of impairment of hearing are generally distinguished:

(1) *Conduction deafness* due to loss in the middle ear only, sensitivity for bone conduction being normal. Often caused by thickening of the tympanum or by otosclerosis.

(2) *Nerve deafness*, in which there is impairment of both air and bone conduction. Associated with degeneration of the sensory cells of the organ of Corti in the inner ear or with other neural damage, such as a tumour of the eighth nerve.

(3) *Central deafness*, which is rare and has no known peripheral origin, being regarded as a central disorder often associated with aphasia. No further mention of this will be made here.

There seems to be no mystery about conduction deafness; the auditory signal is simply attenuated, and this loss may usually be made good with a suitable external amplifier. In nerve deafness, on the other hand, amplification does not make up for the loss, and the defect is not simple attenuation of the signal. The condition has certain rather distinctive features:

(1) There is some degree of confusion. The older term "perception deafness", still sometimes used, indicates this clinical distinction.

(2) The deterioration is mainly at the upper end of the frequency spectrum (presbyacusis), hearing for low frequencies often being normal.

(3) The audiogram is generally "peaky", a sudden dip (loss of sensitivity) at about 4000 cycles being particularly common.

(4) Tinnitus is common, but this may also occur in conduction deafness.

(5) The curious phenomenon of loudness recruitment is common.

Recruitment, which is almost certainly found only in nerve deafness, may be described as a shortening of the loudness scale.

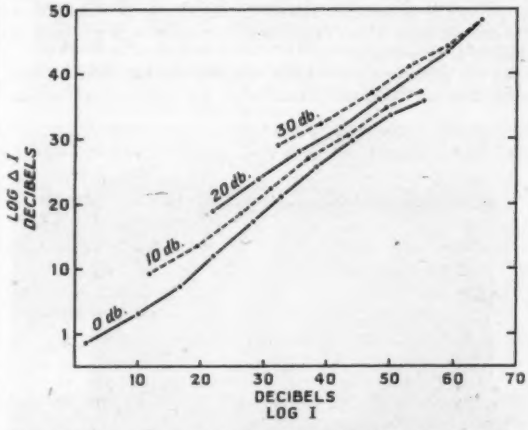


Fig. 1—Effects of nerve deafness on differential threshold. No additional masking has been added; tone pips are of same duration as above but following frequencies have been used: 1000, 1500, 2000, 3000, and 4000 cycles per sec.

Each of 17 persons used was tested for absolute threshold at the above frequencies and compared with average ear to assess impairment for each frequency. Subjects with the same absolute thresholds (i.e., the same impairment) are grouped together. This grouping is irrespective of frequency—subjects are combined for any frequency for which their absolute thresholds are equal. Thus each subject may appear in several of the curves, at various frequencies. Bone conduction to the mastoid process has been used throughout: we are repeating the experiment for air conduction. As in fig. 1, slope flattens with increasing impairment. It seems possible to estimate effective masking noise for various degrees of nerve deafness by comparing curves in figs. 1 and 2 and selecting those giving best fit.

In cases of unilateral nerve deafness it may be demonstrated by applying the same tone to the two ears and asking the patient to balance the intensities for the two ears over a wide range of intensity. Where there is recruitment, the deaf ear will require higher energies at the lower intensities; but, as the level rises, the difference in intensity for loudness balance decreases and may disappear. In conduction deafness the ratio of the two energies will remain constant for loudness balance over the working range of hearing.

Previous work on visual discrimination, where thresholds are supposed to be limited by the effective signal-to-noise ratio of the neural systems involved, suggests a possible explanation of nerve deafness. We have regarded visual discrimination as limited by the channel capacity of the system, the channel capacity being a function of the number of fibres available for discrimination and the level of random neural activity, or "noise", tending to mask the signal. Increase in the amount of noise should raise the threshold and tend to produce confusion. Nerve deafness could be due to loss of channel capacity either through loss of functional fibres or through increased noise. These two possibilities give rather different predictions.

To test the hypothesis that nerve deafness is in some cases due to increased noise masking the auditory signals, we have compared the phenomena of nerve deafness with the effects of noise masking on normal hearing. Their similarity is striking.

Fletcher[1] found that, when he used thermal noise for masking pure tones, the high tones were primarily affected; in other words, he produced presbyacusis in the normal ear by masking with thermal noise. It is well known that partial sectioning of the cochlear nerve produces presbyacusis in cats[2] and also in patients with Ménière's disease.[3] Thus it might be concluded that reduction in channel capacity decreases discrimination of high tones whether this reduction is the result of raised noise or of loss of functional fibres.

1. Fletcher, H. *J. acoust. Soc. Amer.* 1938, **9**, 275.
2. Wever, E. G., Bray, C. W. *J. Psychol*, 1937, **3**, 101. Neff, W. D. *J. comp. physiol. Psychol.* 1947, **40**, 203.
3. Dandy, W. E. *Bull. Johns Hopk. Hosp.* 1933, **53**, 52 (cited by Wever, ref. 8, p. 243).

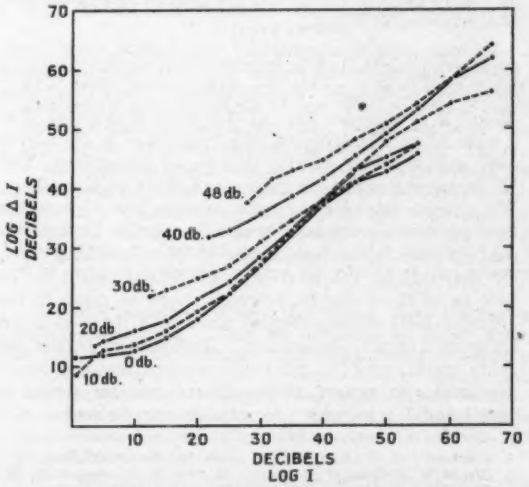


Fig. 2—Effects of various levels of masking noise on threshold for detecting tone pip lasting 0·01 sec. against continuous tone. Frequency of continuous tone and pip is 1000 cycles per sec. Masking noise reduces slope. Bone conduction was used. Pips slightly rounded to reduce transients.

Steinberg and Gardner [4] showed that white noise masking produces recruitment in the normal ear. (In "white" or "thermal" random noise all frequencies are present in equal amounts, producing a hissing sound like escaping steam.) Dix, Hallpike, and Hood [5] found that recruitment appears to be associated with damage to the nerve-endings at the organ of Corti but not with damage to the eighth nerve. This finding is compatible with the hypothesis that neural noise produces recruitment, for disturbance of the nerve-endings (as in Ménière's disease) would be expected to produce random firing, whereas this is not generally found when fibres are sectioned.

When there is marked tinnitus of a particular tone, some loss of hearing is perhaps always found near the corresponding frequency. But although tinnitus is often found with nerve deafness it is not invariably found. We should not expect it if the deafness was due to a tumour of the nerve; but, if the deafness was due to damage of the end-organ, the patient would presumably be aware of his neural noise as some form of tinnitus. If he is not, some explanation is necessary. The normal person is aware of a surprising amount of self-generated sound in a silent room, though he is not normally aware of this internal noise. It is also true that we are not usually aware of irrelevant regular sounds—e.g., the ticking of a clock, and even its chime, when this is familiar, though it may be loud. Perhaps in some cases neural noise is rejected in a similar manner, with the result that, although it may tend to mask wanted sounds, there is no awareness of it as tinnitus, at any rate until attention is called to it.

We have found it necessary, on quite other grounds, to postulate a "gate" in sensory discrimination mechanisms.[6] Perhaps this postulated "gate" is raised to reject abnormally high residual noise. The idea of a "gate" is important: it is taken over from electronics where the term denotes a threshold introduced into a circuit so that voltages below the gate threshold are rejected. The gate may be raised or lowered or may be fixed. This suggests a possible connection between auditory fatigue and nerve deafness, and they have many features in common. If a sustained noise or tone tends to raise the gate, we should expect recruitment (for only the lower-intensity signals will be affected by the gate) and this is in fact the case. Perhaps some of the results obtained by Hood,[7] who has done much work on auditory fatigue, might be interpreted on this hypothesis. Further, the neural origin appears to be the same for nerve deafness as for auditory fatigue—between the electro-cochlear activity and the binaural localisation process, according to Wever.[8]

In examining the possibility that typical nerve deafness is due to raised neural noise we have compared differential intensity discrimination (short-tone pips against a continuous tone of the same frequency) over a wide range of intensities and frequencies in (1) nerve-deaf ears showing various degrees of impairment and (2) the normal ear in the presence of white noise masking. We should expect the curves relating intensity of the tone pip to the continuous tone to be similar for a nerve-deaf ear and a normal ear, subject to added masking noise. By determining the level of noise which produces the best fit of these curves we might hope to estimate the effective level of neurological noise in a nerve-deaf ear showing a given impairment. Preliminary results are fairly encouraging; in particular we find that the curves are similar in general form. These data are shown in figs. 1 and 2, from which comparison may be made.

4. Steinberg, J. C., Gardner, M. B. *J. acoust. Soc. Amer.* 1937, **9**, 11.
5. Dix, M. R., Hallpike, C. S., Hood, J. D. *Proc. R. Soc. Med.* 1948, **41**, 516.
6. Gregory, R. L., Cane, V. R. *Nature, Lond.* 1955, **176**, 1272. Gregory, R. L. Third London Information Symposium (edited by C. Cherry). London, 1956.
7. Hood, J. D. *Ann. Otol. &c., St. Louis*, 1955, **64**, 507.
8. Wever, E. G. Theory of Hearing. New York, 1949.

If nerve deafness may be caused by raised neural noise a practical conclusion seems to follow. To attempt to raise the wanted signal above the residual noise with a linear amplifier (such as a standard hearing-aid) is likely to overload the ear, for it seems clear that there is no abnormal attenuation in the system. Now, it has been shown by Licklider [9] and discussed by Miller [10] that almost all the information-content of speech is carried by the changeover points, and almost none at the energy peaks; it thus appears possible to prevent overloading, while retaining the necessary information, by using suitable peak clipping in hearing aids. This has been tried but has produced only slight improvement.[11] Perhaps in addition it may be necessary to filter out those frequencies where impairment is greatest, because continual stimulation appears, at least in some cases, to increase tinnitus and therefore presumably the amount of neural masking noise.

We wish to thank Dr. E. R. F. W. Crossman, Dr. T. S. Littler, Miss Violet Cane, and Prof. O. L. Zangwill for helpful suggestions and advice. We are indebted to Mr. A. S. H. Walford for providing nerve-deaf patients from Addenbrooke's Hospital. The Medical Research Council gave a grant to one of us (J. G. W.) and a grant for apparatus.

R. L. GREGORY
M.A. Cantab.
JEAN G. WALLACE
B.Com. Edin.

Psychological Laboratory,
Cambridge

New Inventions

A SIMPLE RESECTOSCOPE

MODIFICATIONS of an instrument usually lead to something more complex which requires greater experience in handling. The development of the resectoscope from the days of the Stern/McCarthy ratchet-driven instrument is an example of the complexities which can be superimposed on a machine of initially simple design.

In the past twenty-five years the demand has been for improvement in vision and illumination, for reduction in the size

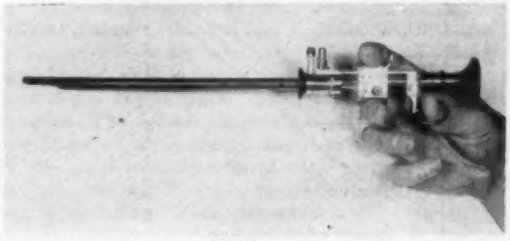


Fig. 1.

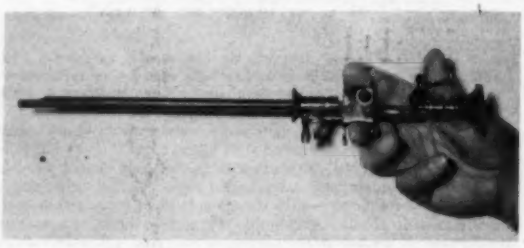


Fig. 2.

9. Licklider, J. C. R. *J. acoust. Soc. Amer.* 1946, **18**, 429.
10. Miller, G. A. Language and Communication. New York, 1951.
11. Littler, T. S. Personal communication.

of the sheath, and for a mechanism which can be operated and rotated with one hand so that a finger of the free hand can be inserted per rectum to assist in the operation.

Several rotatable machines have been designed on either side of the Atlantic, but in most of these the sheath has to be gripped to rotate it. Accordingly the second hand is occupied, and the instrument no longer allows a free hand to examine the prostate per rectum.

The resectoscope illustrated here (figs. 1 and 2) is the result of attempts to fulfil the modern requirements in size, simplicity, and single-handed operating. The telescope is the wide-field fore-oblique McCarthy type, which is interchangeable with all standard American patterns and gives a good clear view. The grip is comfortable, and the distance between the first and second fingers has been reduced by dispensing with the lower guide-rail. A light steady movement is assured by the addition of four small roller-bearings above and below the one remaining guide-rail. A return spring is unnecessary because the movement is free; hence the dangerous rest position with the loop beyond the sheath, as occurs with the Baum-Rucker resectoscope, is avoided. The natural movement of approximating the fingers and thumb while cutting is preferable to the Nesbit principle of cutting while extending the thumb.

The sheath does not rotate on the moving parts, but the grip is equally comfortable with the instrument in the inverted position (fig. 2). This enables the anterior half of the prostate and bladder neck to be resected as easily as the posterior half.

Two sizes of sheath are provided: 26 Charrière and 30 Charrière. The smaller size is adequate for most work; the larger size enables a larger loop to be used if needed.

This instrument has now been used in Bristol for the past eighteen months and has proved itself easy to operate, comfortable to handle, and simple to strip and clean. Decreasing the complexity of the resectoscope has decreased the number of exasperating minor faults. On several occasions more then 20 g. has been resected in less than half an hour.

The instrument can be supplied with duplicate telescopes, duplicate moving parts, panendoscope attachments, and two additional viewing telescopes (right-angled and retrograde). This set is completely self-contained with its own spare parts, which gives the urologist a considerable sense of security.

I wish to thank Mr. S. T. H. Smith and Mr. F. T. D. Lowrie and the staff of the Endoscopic Instrument Co., Ltd. of 62, Shirland-road, London, W.9, for their help and patience in the construction of this instrument.

J. P. MITCHELL
M.S. Lond., F.R.C.S., F.R.C.S.E.
Bristol

AN OBTURATOR FOR FILLING BURR-HOLES

PREOCCUPIED as they are with good functional rather than good cosmetic results, neurosurgeons sometimes forget how serious is the circular depression in the scalp over a burr-hole. We take great pains over proper apposition of the scalp edges of a wound, and very often the scar of a former craniotomy would go unnoticed except for an arc of unsightly tell-tale dents.

These dents are permanent ; and, even if they are covered by hair now, that man may be bald in ten years' time!

Besides the unsightliness there are two very real complications of such depressions. First and most important, every stranger notices them ; acquaintances point and say " Ooh, what have you had done to your head ? " Operations on the head are still almost automatically associated in the lay mind with mental disorder, and from that moment that patient is suspect. The second complication is not rare and depends on the propensity of some patients to finger the depressions and to imagine that they are sometimes swollen, or painful, or represent missing brain tissue.

After two years' trial at the South-East Metropolitan Regional Neurosurgical Centre I am satisfied that flanged obturators made of nylon (fig. 1) are effective and that their use is free from complications. It is obviously desirable to have a versatile button-like plug which will fit burr-holes of different sizes, and after some experiments such a size was determined, as regards diameter of plug and width of flange, which would loosely fit into an average burr-hole finished by a no. 2 or no. 3 Hudson's burr, most commonly used for biopsy or craniotomy. The outer surface of the button (fig. 2) is

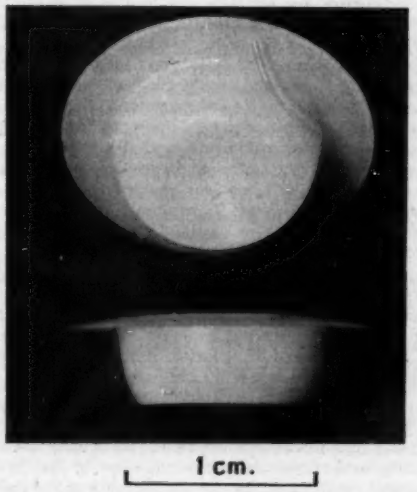


Fig. 1—Obturators. Translucency is a rough guide to the requisite thinness of a flange.

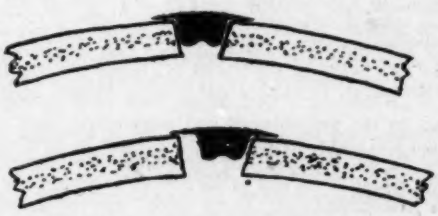


Fig. 2—Showing how a single size of button is applicable to a small or large burr-hole.

ground to a convexity, and the under surface of the flange to a concavity, commensurate with the curve of an average skull ; and there is a dimple in the bottom of the button to accommodate a brain nubbin if necessary. It has not been found necessary to drill a hole through the centre.

The button is dropped into a burr-hole in bare bone, and secured lightly either by stitching pericranium over it, or by crossing it with a stitch (before adopting this technique I had to remove a button which had been floated out of its hole by hæmorrhage beneath the flap). It is now a routine to insert them into all burr-holes except those deep to the temporal muscle.

Properly made with a very thin flange, these buttons are invisible afterwards. They are sterilisable by either boiling or autoclaving, are radiotranslucent, and are about a sixth of the price of tantalum discs. At present they are made individually on a lathe from nylon rod ; but, if the demand warranted it, a steel mould costing several hundred pounds might be made to turn them out in quantity as cheaply as a button in a draper's shop.

The obturators have been dubbed " Brook buttons " and are made and supplied by Messrs. Allen & Hanburys of London.

Brook General Hospital,
Shooters Hill Road,
Woolwich

J. R. GIBBS
M.B. Brist., F.R.C.S.

Medical Societies

THE HEBERDEN SOCIETY

THE annual general meeting of the society was held on Dec. 13 and 14. There follow summaries of some of the papers read at the meeting.

Phenylbutazone in Rheumatic Fever

Dr. G. WILL described the treatment with phenylbutazone of 32 cases (19 males and 13 females) of acute rheumatic fever, all fulfilling the modified Duckett Jones criteria. 17 patients were of 16 years of age or under; and in 21 it was the first known attack of rheumatic fever. 11 patients had been initially treated unsuccessfully with aspirin. The maximum daily dosage of phenylbutazone was 600 mg. This was given for the first few days and was followed by 400 mg. daily for two weeks, then 200 mg. daily for a further two weeks.

In every case there was a rapid response to treatment. Joint pain and swelling were relieved within twenty-four to forty-eight hours and fever and tachycardia settled in three to five days. The sedimentation-rate fell steadily to normal levels: in all cases it had fallen to 15 mm. (Westergren) in one hour or below by the end of the fifth week of treatment. In 2 cases premature cessation of treatment was followed by relapse, with subsequent control on resuming treatment with phenylbutazone. There was only one serious toxic episode in the series, a melæna. 3 patients had mild epistaxis.

Pathology of the Rheumatoid Cervical Spine

Dr. J. BALL said that a characteristic feature of the intervertebral discs of the cervical spine was the presence of a synovial joint—the neurocentral joint—adjacent to their lateral borders. In a postmortem study of 20 cervical spines from typical cases of rheumatoid arthritis (not selected on clinical or radiological grounds) neurocentral arthritis was found in all but 1 of the 18 cases in which this area was examined; apophyseal joints were involved in 19; in neither was there a preferred site of involvement. Disc lesions were often encountered, mainly in the posterolateral and anterolateral parts of the annulus and also along the disc-bone border in these regions. Serial sections indicated that the lesions were extensions of pannus arising in the roof or the anterior or posterior recesses of the neurocentral joint. In the affected area the annulus was replaced by a granulation tissue whose appearance varied according to the degree of maturation; the occurrence of bone in the posterolateral part of the annulus may represent a quiescent stage of a rheumatoid erosion and may be found in association with bony ankylosis of the corresponding neurocentral joint.

Atlanto-axial dislocation was found in 3 cases. Dislocation at the first, second, or third disc occurred in 5; and in each instance there was associated erosion of the disc annulus posteriorly, anteriorly or in both sites. Appreciable disc erosion was not necessarily accompanied by subluxation; occasionally this could be accounted for by ankylosis of the corresponding apophyseal or neurocentral joint. In the single case in which dislocation was severe enough to cause compression of the cord, it was noted that some degree of fixation was present above and below the level of dislocation, due mainly to ankylosis of apophyseal joints.

The disc lesions found in the rheumatoid cases were not encountered in the cervical spines of 12 elderly subjects considered not to have suffered from polyarthritis. It was also noted that whereas in the control cases disc narrowing and osteophytosis were predominantly located at the fourth and fifth discs, in the rheumatoid cases disc narrowing when present showed no such predilection for the lower discs and was often unaccompanied by conspicuous osteophytosis.

Heart lesions in Rheumatoid Disease

Dr. B. CRUICKSHANK remarked that previous workers had described a variety of non-specific cardiac lesions in patients suffering from rheumatoid disease, and the occurrence of rheumatoid granulomata in the heart was well-recognised, though rare. Most of the non-specific lesions had been regarded as rheumatic. The whole picture was complicated by the inclusion of examples of ankylosing spondylitis in several of the previous series.

Heart lesions, other than those attributable to some other disease, had been studied in 100 patients suffering from rheumatoid disease. Rheumatoid granulomata were found in the mitral and aortic rings and cusps in 5 patients and in the myocardium in 1 of these. Active rheumatic heart disease was seen once and healed rheumatic endocarditis in 5 patients, in 2 of whom no histological examination was made. Non-specific chronic endocarditis was seen in 9 patients. Although the macroscopic appearances suggested rheumatic endocarditis, microscopic examination failed to reveal characteristic lesions of that disease. In 4 of these patients the inflammation was active and diffuse, with many of the features found in rheumatoid lesions elsewhere in the body, though necrosis was absent. These were regarded as further examples of rheumatoid endocarditis. The other cardiac lesions encountered were myocarditis (10 patients), arteritis (20), and pericarditis (15), all of which were commoner in patients admitted to hospital for treatment of rheumatoid disease than in those admitted for treatment of intercurrent disease. In many of these patients tissues other than the joints were extensively involved.

The incidence of rheumatic heart-disease was no higher than in unselected necropsy series. Rheumatic fever, it was concluded, played no significant part in causing the cardiac lesions of rheumatoid disease, and many of these lesions were part of the rheumatoid process itself.

Ulcerative Colitis and Arthritis

Dr. B. M. ANSELL and Dr. E. G. L. BYWATERS reviewed all cases of definite ulcerative colitis attending Hammersmith Hospital and the Canadian Red Cross Hospital, Taplow, over the past ten to eleven years. The overall incidence of arthritis appeared to be 15%. 37 cases of arthritis with proved ulcerative colitis from this source and from patients seen at the Central Middlesex and West Middlesex Hospitals have been studied very closely. The knee- and ankle-joints were the ones most often involved and, in contrast to rheumatoid arthritis, hand and tarsal joints were much less often affected. There was a relatively high incidence of sacroiliac involvement, and of particular value diagnostically was the swelling of the proximal and distal interphalangeal joints of the toes.

In most cases the arthritis was that of a recurrent mild synovitis, gross changes being found in only 4 cases, of which only 2 were typical of rheumatoid arthritis with nodule formation and a positive direct agglutination test (D.A.T.). 29 patients had the Rose test repeated on a number of occasions: 25 were persistently negative, the 2 already mentioned were persistently positive, and 2 others positive on one occasion only. 8 of the 37 cases had erythema nodosum and this might occur early in the course of their disease or during an exacerbation. In 7 of these the arthritis was present at the time of the erythema nodosum, and 1 of these patients also had pericarditis.

The frequency of the arthritis, its course and pattern, its joint distribution, its frequent association with erythema nodosum, and the negative D.A.T. suggested that it was a separate arthritis from rheumatoid arthritis, due either to the factor that produces the gut lesion or secondary to that lesion, or if it was rheumatoid arthritis it had been considerably modified by the presence of ulcerative colitis.

Antinuclear Serum Factor in Connective-tissue Disease

Dr. E. J. HOLBOROW and Dr. D. M. WEIR had examined sera from 100 cases of connective-tissue diseases by the fluorescein-conjugated antiglobulin test for the presence of the antinuclear factor previously described [1] in disseminated lupus erythema-

1. Holborow, E. J., Weir, D. M., Johnson, G. D. *Brit. med. J.* 1957, ii, 732.

tosus (D.L.E.). Of 8 cases of D.L.E. 7 were positive for both L.E. cells and the antinuclear factor, and 1, clinically typical, negative in both tests. In 3 out of 4 doubtful cases of D.L.E., the antinuclear factor was found. Of 44 sera from rheumatoid arthritis cases, 8 contained the antinuclear factor. The L.E. cell test was positive in one of the latter (but the result of this test was available in only 14 of the series). In Still's disease, 3 out of 15 cases gave a positive antinuclear factor test; all were L.E.-cell negative. Sera from the following cases were also investigated with negative results: acute rheumatic fever (11 cases), convalescent rheumatic fever (7), polyarteritis nodosa (2), dermatomyositis (1), ankylosing spondylitis (1), and doubtful rheumatoid arthritis (5).

In the positive and negative rheumatoid-arthritis group, comparisons were made between extent and activity of the arthritis, sex, age, duration, E.S.R., D.A.T., and nodules. Middle-aged females with a high D.A.T. and nodules appeared more commonly in the positive group. The affinity of the L.E. globulin factor for white-cell nuclei of the rabbit, rat, mouse, guineapig, chicken, and toad, had been demonstrated, and in the chicken and toad the nucleated red cells also took up the factor. Tissue and white-cell nuclei pretreated with streptodornase fail to take up the factor.

Whether the antinuclear factor was responsible for the development of L.E. remained in doubt; in vivo the factor was not taken up by the cell nuclei of tissues from patients with L.E.; cell nuclei took up the factor only after in-vitro incubation with the patient's own serum. Thus, damage to the cell membrane or nuclear membrane seemed to be an essential prerequisite for uptake of the serum factor.

Rheumatoid Arthritis of the Cervical Spine

Dr. J. SHARP, Mr. D. W. PURSER, and Dr. J. S. LAWRENCE reported that X-rays of the cervical spine of rheumatoid-arthritis patients aged 55–64 had been compared with those of individuals in this age-group selected at random from the general population. The features indicative of rheumatoid arthritis appeared to be narrowing of multiple discs, particularly the upper two (with relatively little osteophytosis of the vertebral bodies and a tendency to erosions rather than sclerosis of the adjacent plates), vertebral subluxation (particularly through narrowed discs or at multiple levels), and erosions of apophyseal joints.

Using these features as criteria, 427 radiographs taken from random samples of the general population in the age-group 55–64 were examined in an effort to recognise the subjects suffering from rheumatoid arthritis. The films were read without knowledge of the clinical or serological findings or of the radiological findings elsewhere.

The prevalence of these changes was found to be 6% in males and 7% in females (in whom the changes tended to be more severe). On comparison with other criteria of rheumatoid arthritis in the population sample, it was found that the cervical changes were significantly associated with positive sheep-cell agglutination tests and also with radiological changes of rheumatoid arthritis in the hands or feet, but only poorly correlated with rheumatoid arthritis as diagnosed clinically. Both clinical rheumatoid arthritis and radiological changes of the disease in the hands or feet, however, showed a very significant association with positive sheep-cell tests.

These findings suggested that in the general population the disease may be encountered in a form in which the spine was mainly or exclusively involved but which was not diagnosed clinically as rheumatoid arthritis in the absence of changes of rheumatoid arthritis in peripheral joints and that this form of the disease may be important in studies of the prevalence of rheumatoid arthritis in populations, since it may account for some apparently "false" positive results in the sheep-cell agglutination test. In clinical practice, rheumatoid involvement of the cervical spine was important both on account of the associated pain, which may be severe, and the resultant mechanical instability, which may lead to severe cord damage.

Reviews of Books

Cortisone Therapy

J. H. GLYN, M.D., M.R.C.P., D.PHYS.MED., consultant in physical medicine, Prince of Wales and Tottenham Group of Hospitals. London: Heinemann. 1957. Pp. 162. 21*s*.

THE experience of eight years has not sufficed to define clearly all the indications for the use of cortisone and all its limitations. That controversy has not yet been stilled is no reason for denying to those who seek it a convenient source of guidance on the present position of treatment with the hormone or its related steroids. Such guidance Dr. Glyn has now concisely supplied, in a form that will be widely appreciated.

He has had much experience of cortisone in the treatment of rheumatic disorders, and his views are very personal. As Lord Cohen of Birkenhead remarks in a foreword, not all will approve unreservedly of the opinions expressed; but in general these opinions are unlikely to lead the practising clinician far astray. In rheumatoid arthritis, Dr. Glyn's view is that steroids are strongly indicated in some 10% of cases. His reaction to the results of controlled trials, comparing cortisone and aspirin in the treatment of rheumatoid arthritis, is that they served to curb overenthusiasm for cortisone without necessarily casting serious doubts on the wisdom of its use under particular circumstances. He holds that individual patients may benefit more from cortisone than from other forms of treatment, and that statistically controlled trials may fail to establish this; he tends to accept or reject the evidence of controlled experiment according to whether or not it agrees with his own impressions. Thus, in discussing whether cortisone is a useful adjunct to manipulation, he is reluctant to accept the negative results of a trial; and elsewhere uncontrolled clinical data bearing on the role of steroids in precipitating arteritis are rejected and statistical corroboration demanded. The reader is left in little doubt, however, that opinion on many topics has not yet crystallised, and the practical advice on administration and precautions is very sound. Dr. Glyn believes that the dangers of steroid therapy have been overemphasised, but he gives a full account of its undesirable effects.

In an appendix by Dr. J. G. Bearn, some good anatomical guidance is given on the technique of intra-articular and other forms of local-injection treatment with steroids. The book concludes with some suggestions for assessing and recording clinical progress and with a short bibliography.

Current Surgical Management

Editors. JOHN H. MULHOLLAND, M.D., professor of surgery, New York University School of Medicine; EDWIN H. ELLISON, M.D., associate professor of surgery, Ohio State College of Medicine; STANLEY R. FRIESEN, M.D., associate professor of surgery, pathology, and oncology, University of Kansas School of Medicine. Philadelphia and London: W. B. Saunders. 1957. Pp. 494. 70*s*.

WHAT an exciting book this might have been! The editors invited some of the leading exponents of opposing schools of surgical thought not only to air their views but to thrash out their problems in open debate. The subjects ranged from the management of acute cholecystitis to perforating wounds of the heart; and they included such controversial topics as the treatment of peptic ulcer, regional ileitis, cancer of the breast, cancer of the thyroid, pancreatitis, and burns. The list of contributors guaranteed that the opinions expressed, however extreme, would merit a few moments' thought at least.

If the hopes thus generated by the contents page had been less high, there might have been no disappointment. Some of the sections are indeed admirable. Blakemore, Garrott Allen, Child, Robert Moore, and A. C. Singleton on portal hypertension and bleeding œsophageal varices provide the most lavish fare; but there are others almost equally good. As a whole, however, the book falls short of expectation. As the editors themselves remark, "what appears on the surface as marked differences of opinion is (often) not so marked when more deeply probed": and much that is stale might have

been eliminated by some preliminary probing. (In many chapters there is more than a suspicion of argument for argument's sake.) When serious differences of opinion do exist, they most commonly spring from ignorance over fundamental issues, and whereas intelligent ignorance tends to stimulate live discussion, it reproduces poorly in print. On other subjects the differences arise from variations in experience, skill, and temperament; and these too are hard to codify.

Despite such intrinsic difficulties, it might have been possible to present surgery in the form of conflict rather than of compromise: many word-for-word transcriptions of panel-discussions and round-table conferences prove that this can be done. Unfortunately, this book rarely captures their uninhibited and spontaneous flavour. Most of the contributors, though they ably state their case, seem reluctant to criticise or even to enter into discussion: their chapters read like eloquent closing speeches for the prosecution after the accused has offered a particularly unconvincing defence. The best sections present complementary rather than alternative methods of treatment.

Despite these shortcomings, there is much to interest and to stimulate; and the book reflects the prodigality of ideas and the healthy scepticism for the old-established which are characteristics of American surgery.

Patients as People

A. E. CLARK-KENNEDY, M.D., F.R.C.P., fellow of Corpus Christi College, Cambridge, physician, the London Hospital, and formerly dean of the medical school. London: Faber & Faber. 1957. Pp. 251. 15*s*.

THE title of Dr. Clark-Kennedy's new book would have made Sydenham, Trousseau, and Osler stare in incomprehension: how else could one think, talk, or write about patients? Yet today the publishers can claim that this is an " entirely new " approach. One need only compare the arid prose of many medical texts with the beguiling personal touch with which engineers reveal to us nowadays the secret lives of hi-fi equipments and motorcar engines to realise how necessary it is to add " as people ".

To his earlier distinguished books of untraditional style, Dr. Clark-Kennedy now adds one in which abstract descriptions of disease are replaced by lightly sketched portraits of " people suffering from those changes of state which we talk of as diseases . . . with not only symptoms and signs, but also faults and failings and human hopes and fears, which the doctors, being human too and depicted here as real and fallible people, sometimes fail to sense ". It may not be entirely new; but it is as welcome a change as the first fresh strawberry. From the hands of doctors and medical students it will no doubt find its way to the bedside tables of wives and landladies. Among the characters, vividly and affectionately drawn, they too will find their favourites; and arriving at the last page, they will sigh and wish for more.

The Forequarter Amputation

H. F. MOSELEY, D.M., M.CHIR., F.R.C.S., assistant professor of of surgery, McGill University. Edinburgh and London: E. & S. Livingstone. 1957. Pp. 79. 42*s*.

THE day may not be far distant when the techniques of forequarter and hindquarter amputation will seem only a shade less archaic and barbarous than the ritual of the cautery and boiling pitch. But in many cases of cancer they at present offer, for the courageous patient supported by the resolute surgeon, the only alternatives to a particularly unpleasant death.

The surgeon contemplating such an operation on the upper limb will welcome Professor Moseley's study of the subject. His previous writings on the shoulder-joint have made him an accepted authority on this region; here he is principally concerned with the anatomical basis of the operation. The indications for it, and the modifications necessitated by particular cases, are not discussed in detail. (The book should be read in conjunction with Pack's valuable articles).[1] There are, however, chapters on the history of the operation and on the less familiar procedure, scapulectomy. A detailed bibliography of all the reported instances of traumatic avulsion of the arm is appended; and the text itself is beautifully illustrated by coloured plates.

1. See *Surg. Gynec. Obstet.* 1942, **74**, 161.

Fluid Balance Without Tears

The Child's Guide to Electrolytes. G. L. BUNTON, M.CHIR., F.R.C.S. Pp. 28. 4*s*. 6*d*. (Available from the author, at University College Hospital, London, W.C.1.)

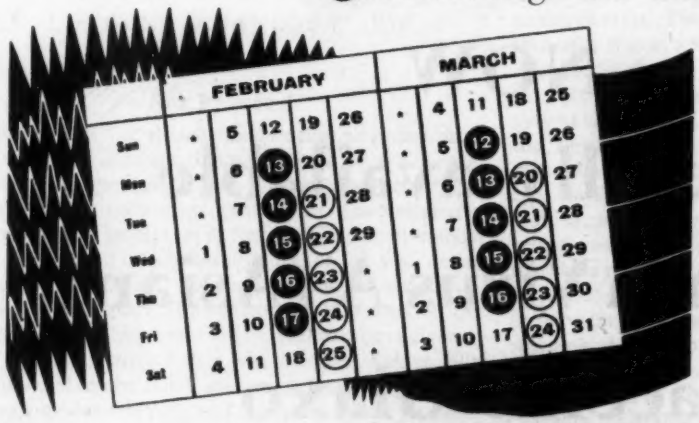
THOUGH the theory underlying the effects of body-fluid depletion and their management is complex, the practical aspects of prevention and treatment are in the main simple. In this refreshingly brief and uncomplicated booklet Mr. Bunton describes these matters with admirable clarity, the main points being emphasised by his own pungent cartoons. Of necessity in so short a book there are many dogmatic statements and points of emphasis with which some will disagree, but within the scope modestly implied by the title this work attains all that it sets out to achieve.

To students, housemen, and all those interested in the basic facts of this important part of surgical care, this book can be warmly commended. We congratulate Mr. Bunton on producing so useful and stimulating a book.

Disorders of the Blood (8th ed. London: J. & A. Churchill. 1957. Pp. 878. 75*s*.).—Since its first appearance 22 years ago, successive editions have established Whitby and Britton as the standard British text on hæmatology. Unhappily the death of Sir Lionel Whitby means that this edition must be the last produced by the original partners. To prevent it becoming unwieldy, a smaller but very clear print has been used, and much of the older material has been closely pruned. The changing picture of blood diseases has been dealt with in two ways—by detailed revision of the text and by complete rewriting of some chapters. The chapters on hæmolytic anæmia and on the purpuric and hæmorrhagic diseases have been rewritten, and they are now very good. Elsewhere revision has been carried out so that new work is skilfully included, but the awful " Smith says now and Jones says yes " style has been avoided. The smooth reading that has always been a quality of this book is thus preserved. Inevitably, the difficult task of keeping a standard textbook up to date has faltered in places, and the chapters on leukæmia and on technique seem due for comprehensive recasting. The practice of giving trade names of recommended drugs is helpful, but unfair when complete lists are not given. Some of the additions seem to be uncritical; for example, on p. 201 we are sorry to see, in a useful table on iron compounds, figures about utilisation that derive more from the beliefs of over-enthusiastic advertisers than from published and more sceptical work. But these are the few defects in a book that continues to provide a " comprehensive working guide and source of reference " and to provide it very well. And, in spite of its growth, it is still remarkably cheap.

Medical Writing (3rd ed. New York and London: McGraw Hill. 1957. Pp. 239. 52*s*. 6*d*.).—One of the chief horrors of George Orwell's *1984* was the rulers' deliberate distortion of language to make it impossible for the proles to think clearly. In his essays, Orwell showed repeatedly that sloppy language (especially officialese) could be a cause as well as an effect of sloppy thought, and could even thus serve the ends of dictatorship. Dr. Morris Fishbein is an old campaigner in the struggle for " plain English diction ", and much of his book is devoted to matters of style; the rest is concerned more specifically with the needs of medical journals, giving instruction in such topics as illustrations and the preparation of manuscripts. In the new edition many sections have been revised. We welcomed the first edition in 1938, with some reservations because of the difference between English and American usage, which still hold good; but almost anyone planning to write a medical article would profit by Dr. Fishbein's advice. He who writes on writing throws stones from a glass house; but few of Dr. Fishbein's panes are likely to be broken.

Restoring the normal rhythm

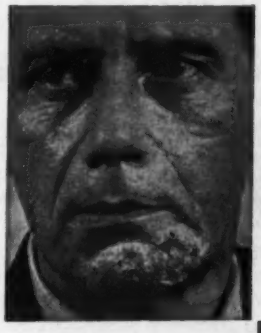


"MENSTROGEN" provides the safe, simple, effective oral treatment of amenorrhoea. To establish cyclic menstruation, treatment should be repeated every four weeks for a few months. Failure of the treatment necessitates further investigation of the cause of the amenorrhoea (e.g. Pregnancy). Available in tablet and ampoule form.

●—4 Tablets Daily—for 5 days—Every 4 weeks.
○—Menstruation can be expected.

MENSTROGEN

ORGANON LABORATORIES LIMITED
BRETTENHAM HOUSE, LANCASTER PLACE, LONDON, W.C.2
Telephone: TEMple Bar 6785/6/7, 0251/2/3, 1942/3. Telegrams: Menformon, Rand, London



Diagnosis: Obstinate eczema of the face. Photograph taken before treatment with "F99".

Photograph taken after 18 weeks' treatment with one "F99" capsule and one application of "F99" ointment daily.

℞ F99 for

OINTMENT
CAPSULES
LIQUID

ECZEMA
VARICOSE ULCERS
FURUNCULOSIS

It has been shown beyond question by large scale serum-lipids studies that a good proportion of patients suffering from intractable skin conditions have a deficiency of the essential fatty acids. It is not possible to carry out these studies in everyday practice, but any patient with eczema or furunculosis who fails to respond to symptomatic treatment should most certainly be tried with essential fatty acids "F99". A high proportion of these patients will be found to respond.
In gravitational ulcers, where the skin is "under-nourished", the application of additional essential fatty acids rarely fails to heal the wound.

Literature on request

INTERNATIONAL LABORATORIES LTD. *Dept. LT35*, **205, HOOK ROAD, CHESSINGTON, SURREY**

NOW generally available Influenza Virus A (Asian) Vaccine Glaxo

For several months Glaxo Laboratories Ltd., have been producing INFLUENZA VIRUS A (ASIAN) VACCINE for distribution by the Ministry of Health to certain priority groups, such as doctors and nurses. Now we are pleased to tell you that supplies of this vaccine are generally available to the Medical Profession and through retail chemists on prescription.

The vaccine, which is Glaxo made throughout, is issued in boxes of two and six 1 cc. ampoules. When not in use it should be stored in a refrigerator.

GLAXO LABORATORIES LTD., GREENFORD, MIDDLESEX. BYRon 3434

Subsidiary Companies or Agents in most countries

THE LANCET
LONDON 11 JANUARY 1958

Sex Reversal

By the " sex " of an individual we may nowadays mean one of several different things—such as the genetic sex, determined cytologically; the gonadal sex, determined with certainty only histologically; the anatomical sex, determined by inspection of the genitalia; the hormonal sex, determined biochemically; the social sex, determined by upbringing; and the psychological sex, determined by behaviour. In most of us, of course, all the " sexes " agree: but results at any level may be equivocal; and when unequivocal they may disagree with equally unequivocal results at any other level. Such discrepancies are only moderately rare, and it begins to seem probable that every possible permutation of discrepancies can occur. The older classifications of " pseudohermaphroditism " and the like are no longer sufficient, and there is urgent need of a new terminology. And it is, for instance, not really justifiable to limit the term " sex reversal " as Dr. ASHLEY and Dr. JONES do in their paper on p. 74 to simple discrepancy between genetic sex and all the other " sexes ": at the opposite end of the scale transvestitism is equally a sex reversal.

Nevertheless, if only because of the light thrown on them simultaneously by nuclear sexing techniques, it is worth considering together briefly the known varieties of extreme discrepancy between genetic sex and apparent sex. There are perhaps four: chromatin-negative Turner's syndrome (genetic male, gonad neutral, otherwise feminoid); chromatin-positive Klinefelter's syndrome (genetic female, gonad male, otherwise masculinoid); " testicular feminisation " (genetic male, gonad male, otherwise feminoid); and ASHLEY and JONES' case (genetic male, gonad female, otherwise feminoid). The first two are now very well known, and nuclear sexing, especially by the oral-mucosal smear technique, has so facilitated their recognition that they are becoming almost common [1–7]; but the two latter are less familiar.

When reported at a meeting last summer, ASHLEY and JONES' case was in fact the first certain example of its kind to be described: there are a few possible earlier cases, but in none is information complete enough for certainty. The infant was by all ordinary criteria female: there were some minor pseudohermaphroditic features (an enlarged clitoris and a double urethra), but the vagina, uterus, tubes, and ovaries were clearly female, and the ovary had a full complement of ova. The only discrepancy is the male nuclear sex. In a sense, this is a mirror image of chromatin-positive Klinefelter's syndrome—male gonad and habitus with female nuclei in the one, female gonad and habitus with male nuclei in the other—though it would be unwise to push that analogy too far. There will almost certainly be a tendency to regard this as a mere variant of Turner's syndrome. Admittedly there is a variety of Turner's syndrome [8 9] in which virilisation occurs to a minor degree, with clitoral enlargement (one can probably blame activity of the Leydig-like hilus cells [10] for this); and the mild pseudohermaphroditic features of ASHLEY and JONES' case could probably be explained in this way. There are also cases of Turner's syndrome in which the ovarian vestige contains a few follicles,[3] and it is just possible that these represent the adult state of ASHLEY and JONES' case. But on the whole it seems better to regard this for the present as a new and separate entity. Apart from anything else, acceptance of it as a variant of Turner's syndrome could overturn the whole satisfactory edifice of explanation of that syndrome as a kind of intrauterine castration; for this patient is certainly not a castrate. Some distinct mechanism must have been operative, and one can do no more than speculate on its nature.

A minor but most interesting point emerges from the case. The nuclear sex, tested at several points, is male, but the polymorphs are female. Similar discrepancies have been noted in Klinefelter's syndrome in the opposite direction.[11] One may add to this the fact that the characteristic drumstick structures seen in polymorphs in blood-films from females are seen in several animal species—notably the rabbit—in which the sex chromatin cannot be seen in tissue nuclei. It is increasingly apparent that DAVIDSON and SMITH's polymorph drumsticks are not simply modified sex-chromatin bodies.[12] The question now arises, what are they?—a fascinating new problem. Meanwhile, it is clearly no longer sufficient to rely on polymorph sexing in cases of possible sex reversal.

The fourth of the sex reversals deserves to be better known, and certainly better considered than in our last brief and partly inaccurate mention of it.[13] It is a very well defined syndrome with a considerable literature, which has, we fancy, missed the public eye chiefly for lack of a sufficiently exact name. " Male pseudohermaphroditism ", variously qualified, is its usual label, but that is too vague and all-inclusive a term. MORRIS,[14] though he did not discover or claim to discover it (he collected 72 reported cases), suggested the term " testicular feminisation ", a name at once compact, evocative, and precise, and one which we think (pace Dr. SWYER [15]) might well be adopted. Essentially the condition consists in the combination of male nuclear sex and testes with a fully feminine external anatomy and endocrine status.[14 16 17] (The nuclear sex has of course been determined only in recent cases, but there seems to be no doubt that it is constantly male [18 19]: an error in these columns [13] was derived from a misreading of DANON and SACHS' paper.[20]) Though many cases present themselves

1. Polani, P., Lessof, M. H., Bishop, P. M. F. *Lancet*, 1956, ii, 118.
2. Grumbach, M. M., Blanc, W. A., Engle, E. T. *J. clin. Endocrin*, 1957, **17**, 703.
3. Hoffenberg, R., Jackson, W. P. U. *Brit. med. J.*, 1957, ii, 1457.
4. Wiedemann H.-R., Tolksdorf, M., Romatowski, H. *Artzl. Wschr.* 1957, **12**, 857.
5. *Lancet*, 1956, ii, 127.
6. Nelson, W. O. *Acta endocr. Copenhagen*, 1956, **23**, 227.
7. Ferguson-Smith, M. A., Lennox, B., Mack, W. S., Stewart, J. S. S. *Lancet*, 1957, ii, 155.
8. Russell, A., Levin, B., Wilmers, M. J. *Proc. R. Soc. Med.* 1955, **48**, 318.
9. Greenblatt, R. B., Higdon, I. *J. clin. Endocrin.* **16**, 235.
10. Sternberg, W. H. *Amer. J. Path.* 1949, **25**, 493.
11. Plunkett, E. R., Barr, M. L. *Lancet*, 1956, ii, 853.
12. Ashley, D. J. B. *Nature, Lond.* 1957, **179**, 969.
13. *Lancet*, 1957, ii, 31.
14. Morris, J. M. *Amer. J. Obstet. Gynec.* 1953, **65**, 1192.
15. Swyer, G. I. M. *Lancet*, 1957, ii, 144.
16. Beatty, D. C., Champ, C. J., Swyer, G. I. M. *Brit. med. J.* 1953, **i**, 1369.
17. Schaumkell, K. W., Stange, H.-H. *Arch. Gynäk.* 1956, **37**, 1449.
18. Gresham, G. A., *J. Path. Bact.* 1955, **70**, 546.
19. Segal, S. J., Nelson, W.O. *J. clin. Endocrin.* 1957, **17**, 676.
20. Danon, M. Sachs, L. *Lancet*, 1957, ii, 20.

early in life with inguinal herniæ [21]—operation on which results in discovery of the testis in or near the sac—the most striking cases are those found later in life, after they have undergone what seems to be a normal puberty apart from amenorrhœa. They then appear, in build, external genital anatomy, breast development, and social attitudes, to be normal women; but they sometimes have moderately eunuchoid proportions, and usually the body hair is deficient. Gynæcological examination reveals a blind vagina and absence of the uterus: laparotomy shows gonads which may closely imitate ovaries in external appearance and site (though they may descend to the inguinal canal and then give rise to herniæ) but in histology are clearly testes. They are not normal testes, but then they are not at the normal site of testes; and their abnormalities are, at least chiefly, those constantly seen in cryptorchidism. In some cases at any rate they have shown some degree of spermatogenesis,[22] and they have the increased liability to tumour of all abdominal testes. It is beyond doubt that these gonads are testes: but it is equally beyond doubt that they secrete female hormones, for their removal produces menopausal symptoms and breast atrophy.[23]

Often if not always this condition is hereditary, and some remarkable pedigrees are known.[22] Though the exact mechanism of inheritance has been [22] and is [20 24] a matter of dispute, it is evidently transmitted through the female only: in affected sibships all, or nearly all, the males become testicular-feminoids, and all the females are normally fertile, half of them being carriers. Unless one restricts definition very closely to cases with the completest feminisation, this variety of sex reversal is not very rare: and there is a very real need—greater perhaps even than with other varieties—that the doctors who handle such a case in the first place should understand something of its nature. (DIEKE [25] gives a vivid illustration of the dangers of vacillation.) The discovery of testes must not be made a signal for drastic attempts to change the established sex of the patient: nor should the testes be removed—at any rate before the age of 20—for they provide the hormones essential for adolescent development. There is a case for their removal later in life, as a potential source of tumours: in this respect, and this alone, we can treat them as ordinary cryptorchid testes. Quite apart from such practical issues, these cases are of very great interest, and some part of the light which has beaten recently on other types of sex reversal might well be spread to include this variety. Guidance would be especially welcome on the prognosis of feminoid children found to have testes early in life: may we always assume that these anomalous gonads will produce feminising hormones at puberty, or is there a risk of virilisation, and if so, are there any criteria by which one can recognise the cases concerned? And is it true [21] that these patients not only do not produce their own androgens, but are resistant to therapeutic doses of synthetic androgens?

21. Deamer, W. C. *Amer. J. Dis. Child.* 1954, **88**, 497.
22. Petterson, G., Bonnier, G. *Hereditas*, 1937, **23**, 49.
23. Goldberg, M. B., Maxwell, A. F. *J. clin. Endocrin.* 1948, **8**, 367.
24. Witschi, E., Nelson, W. O., Segal, S. J. *ibid.* 1957, **17**, 737.
25. Dieke, W. *Zbl. Gynäk.* 1956, **23**, 889 (in appendix, p. 916).

Dr. SWYER, who very properly pointed out the errors in our early editorial,[13] took us to task also [15] for saying that no combination of hormones has yet made an XY breast secrete milk. The example he gives in refutation is a poor one, for Foss [26] produced only a drop of "colostrum" from his transvestite—hardly milk. He might better have quoted the engorgement with milk produced in male rat breasts by multiple hormone treatment.[27] But even that milk did not reach the exterior—it was only halfway secreted. There are still *some* limits to what hormones can do to a male breast.

Occupation and Compensation

IN the course of a chronic disease many circumstances tend to produce neurosis; and when the disease is occupational, permanent in its effects, sometimes difficult to diagnose, and responsible for a disability often hard to assess, these circumstances are particularly potent. Following a discussion on the working of the National Insurance (Industrial Injuries) Act at a recent course on industrial pulmonary diseases at Hammersmith Hospital, correspondents in our columns have emphasised how administrative difficulties influence decisions about benefit claims for pneumoconiosis. Critics have pointed to the anomaly where one man severely disabled by chronic pulmonary disease has his claim rejected and another with little functional impairment obtains benefit; to lack of uniformity in the application of the Act in different localities; to overmuch importance attached to X-ray appearances; to failure to use respiratory-function tests; and to the rejection of some applicants without clinical examination after initial scrutiny of chest X-ray films. On the other hand, it has been submitted that, though discrepancies arise, the present arrangement works very well within the framework of the law, and that it would be hard to find a better.

It is not to be disputed that bronchitis and emphysema are commoner among workers in many dusty occupations than among the general population; and the inference is that some of the increase is occupational. On the other hand, bronchitis and emphysema are common in city-dwellers with no occupational exposure to dust or fumes. Claimants whose X-ray films show the characteristic changes associated with pneumoconiosis can usually be accepted without question as having occupational disease, but doubt exists in the cases without typical radiological findings. As the law stands, bronchitis and emphysema are not pneumoconiosis and so are not compensable. Whatever part the X-ray examination may be held to play in assessing the stage of the disease, it is undoubtedly a necessary step in diagnosis. The dilemma of the administrators is that the restriction of benefit to claimants with pneumoconiosis as at present defined by law means the rejection of some men and women with chronic pulmonary disease which may be of occupational origin, while widening the scope of the scheme would admit to benefit many non-occupational cases.

26. Foss, G. L. *J. Endocrin.* 1956-57, **14**, vi.
27. Lyons, W. R., Li, C. H., Johnson, R. E., Cole, R. D. *J. clin. Endocrin.* 1954, **14**, 831 (abstr.).

The past twenty years have seen a very considerable widening of the scope of the original Workmen's Compensation Act in regard to industrial pulmonary disease. Nevertheless criticisms do not seem to have diminished, and the sense of frustration experienced by rejected claimants, their relatives and workmates, and their doctors, when the disability is strongly believed to be occupational, is hard to dispel. Moreover, there is misunderstanding of the functions and the powers of the pneumoconiosis medical panels and of the reasons for rejecting particular claims. Further widening of the scope of the Act will do nothing to remove the causes of dispute, but merely extend the limits of controversy. The main cause of contention is the considerable difference between the rates of benefit payable in industrial and non-industrial diseases. It becomes an important issue for the workman to establish that his disease is occupational in origin. It is often impossible to do this beyond doubt: it may be easy to exclude an occupational cause if there has been no exposure to dust or fumes, but in a group of workmen occupationally exposed what doctor would undertake to distinguish the occupational from the non-occupational cases of bronchitis and emphysema in the absence of characteristic X-ray findings? The same problem arises in connection with other industrial diseases—notably perhaps, dermatitis—where the difficulty of establishing the precise cause of the disease, and the ensuing litigation, may contribute greatly to the anxiety, depression, and even demoralisation of the sufferer.

What is the basis for compensation schemes? Are there valid reasons for paying a higher rate of benefit for an injury or disease arising in the course of employment than for one contracted in the domestic or public environment—for a factory accident than for a street accident, for pneumonia due to accidental exposure to nitrous fumes at work than for pneumonia complicating influenza, for pulmonary disability due to industrial dust than for that contracted through living in overcrowded conditions? Doctors who worked in child-welfare clinics in the 1930s will remember the many infants who suffered from repeated, almost continuous, bronchitis. Are they now among the chronic bronchitics of the community, some of them workers in mines or foundries and blaming dust for their condition? Why should a man who chooses to work in an industry with a known dust hazard qualify for a higher rate of benefit if he contracts pneumoconiosis than the equally disabled chronic bronchitic who had no control over the environment which caused his condition? Would not the paying of equal rates of benefit be reasonable?

The widespread feeling of dissatisfaction with the Industrial Injuries Benefit Schemes undoubtedly has its origin in the different rates of benefit payable for industrial and non-industrial illness. During the discussion at Hammersmith Hospital Dr. A. T. DOIG called attention to the need for examining the position and equating the two rates, and Dr. GILSON and Dr. HUGH-JONES and their colleagues suggested similar action in their letter of Dec. 7:

> "Two courses are possible. The first is to abandon the rigid attribution requirement [i.e., that the disease shall be attributable to the occupation in the individual case] and, in occupations where epidemiological studies have shown an increase in the prevalence of the common diseases, to compensate any disabled man as if all his disability was due to occupation. This would remove the injustices which your correspondents claim to exist, but only at the expense of introducing new ones. . . . The second requires a fundamental change in approach—namely, to make provision under the National Health Insurance Scheme for adequate benefits for the disabled irrespective of how the disablement has been caused. If this were done, epidemiological studies would return to their primary objective—prevention."

The opener of the debate in our columns, Dr. NORMAN MACDONALD, also supports this second course in his closing letter of Dec. 28. He returns to his early suggestion, which seems to have been lost sight of in some of the succeeding letters, that a fully independent committee or commission should be set up to review the position. As he says, the problem has been in the past, and still is, altogether too vexatious and absorbent of time and mental energy, which could be better devoted to preventive measures. Its solution would bring a sense of freedom and relief to all concerned.

Annotations

GETTING OVER OPERATIONS

As Dr. R. M. Davies told the Section of Anæsthetics of the Royal Society of Medicine last Friday, a patient's need of skill and care following surgery is most acute as he leaves the operating-theatre, for he is then suffering not only from his disease but also from the effects of operative trauma and the residua of anæsthesia. Yet at precisely this moment he is likely to be sent on a long journey to a ward, which can in itself be dangerous. The particular kind of skill and care he needs cannot be provided consistently throughout the surgical wards, and in Dr. Davies' opinion it is best concentrated in a single ward where all patients should stay for a while immediately after operation. This ward should be very near the theatre, so that long journeys are avoided and the surgeon and anæsthetist can get quickly to the patient if necessary.

Mr. J. R. Belcher, and other speakers who followed him, were generally in agreement with these principles; but Mr. Belcher thought that more emphasis should be placed on recovery before the patient leaves the theatre. No patient, he thought, should leave the theatre till he is breathing well and reasonably conscious, and warm if he has had hypothermia. In the discussion, nobody spoke against recovery wards or disputed Dr. Davies' contention that they save lives, as his experience with 33,000 patients at East Grinstead shows. Some thought that not every patient should go through a recovery ward; but, as Dr. Davies said, the anæsthetist cannot tell in advance which patients are going to be in trouble. As regards the ideal size and organisation of such a ward, most speakers agreed that this must vary with the type of hospital. Patients who have metabolic difficulties (e.g., after hypophysectomy) or have had unusual operations (e.g., involving a cardiopulmonary bypass) may need special provision. Skilled nursing is essential and a day-

and-night service highly desirable, especially since emergency patients are the ones who stand in most need of recovery rooms. The ward, it was felt, should probably be in the charge of an anæsthetist, and a resident in anæsthetics act as the house-physician. The nurse in charge should have the rank of sister and should remain in the ward for several months: in some hospitals with recovery wards the student nurses spend short periods there, which gives them experience they would otherwise miss because the patients are no longer treated in general wards; but in others the ward is staffed by part-time qualified nurses from outside the hospital. In a hospital which has many scattered theatres, a choice must be made between concentration of skill and apparatus, on one hand, and proximity of the recovery ward to the theatre on the other. Most speakers favoured proximity, if a choice must be made; though the answer might be different if nurses were scarce.

Prof. E. A. Pask felt sorry for the patient who had been in the general ward long enough to get used to the staff, and awoke after operation in strange surroundings. Other speakers had found that patients do not mind this, if they have been told beforehand, and indeed welcome the solitude in which they awake. Some thought that the patient should spend the day before operation in the recovery ward; this would be hard on the patient at the bottom of the operating-list, who will see his predecessors return laden with drips and tubes and perhaps vomiting, but would avoid much of the nocturnal turmoil of general wards where emergency patients are admitted. Perhaps the ideal would be to admit night emergency patients to the recovery ward before operation, but other patients only after operation. Patients should stay in the recovery ward for as long as it will benefit them—which may be for minutes or for days.

Dr. G. F. Rawdon Smith feared lest the development of recovery wards should lead to yet another specialty. Professor Pask replied that this warning came too late, for in France there is already the *réanimateur*, and doubtless he will come to Britain with the Common Market.

KURU

THE discovery of a new disease has the same fascination as the identification of a new element or a new planet. Four years ago Patrol-Officer J. R. MacArthur reported a strange endemic disorder in a newly explored area south of Mount Michael in the Eastern Highlands of Australian New Guinea. He wrote: " I observed a small girl sitting down beside a fire. She was shivering violently and her head was jerking spasmodically from side to side. I was told that she was a victim of sorcery." This trembling disease (it was called *kuru*), with its preference for females and its fatal outcome, had been known to the Fore tribe, who now number about 11,000, as their special curse for at least twenty years, and it had been observed by Berndt in 1952 and 1953 in them and adjoining peoples. Extensive investigations were undertaken by Zigas and Gajdusek, who with commendable enterprise established a kuru research centre at the Okapa patrol post. Their first reports [1 2] record their findings in 150 cases.

The disease, which has been observed at ages from 5 to " over 40 ", is confined to the Fore people and to members of contiguous tribes intermarrying with them. It is, for instance, unknown in the neighbouring Kukukus who have no marriage contacts with them and who are cut off by the formidable barrier of the Lamari river; but it has arisen in several members of a substantial party of Ingarias who migrated from the western slopes of Mount Michael, later to intermarry with the Fores. The disease has also been reported, however, in a few women from communities with a low kuru incidence after entry into a kuru region, and this fact has to be satisfactorily explained before this can be accepted as a genetically determined disease. The male/female ratio is 1/5·42, and in 23% of the observed cases the patient's age was less than 15. About 1% of the total population is at present affected, but in certain localities this figure may reach 10%; indeed, kuru sometimes accounts for half the deaths in a community.

The onset is insidious, with ataxia (" loose knees "), but about a third of the patients have prodromal symptoms (not, so far, observed)—knee pains, headaches, malaise, fever, cough, and coryza, in order of frequency, but never an acute illness. As the ataxia progresses a distinctive tremor appears, irregular but fine, involving the head, trunk, and limbs; it is aggravated by excitement, fatigue, or attempts at voluntary movement. It tends to subside during relaxation and disappears during sleep. In the second and third months the tremors coarsen and interfere with work and sleep, but the state of nutrition remains good. Choreiform jerks with wild athetotic movements may appear, especially when the patient tries to stand. Emotional behaviour may be prominent, paroxysmal hilarity alternating with moods of depression. By this stage the patient has to use a stick for support while attempting her daily work, but soon she is forced to sit and has to be carried to the pig feasts and other tribal ceremonies. A progressive dysarthria sets in and often a convergent strabismus, a flexed posture, and a parkinsonian facies. Soon she is confined indoors, mute and doubly incontinent, and rapidly succumbs to starvation, decubitus, or some intercurrent infection.

The course of this disorder is from three months to two years or more, with an average of six to nine months. Although it is almost always steadily progressive, in 2 cases remissions have been observed (two in 1 case) followed by relapses; 2 presumed instances of the disease were noted to appear and remit with the menstrual cycle. Kuru, which is apyrexial throughout, does not interfere with pregnancy and there are no physical signs other than those referable to the central nervous system. The fundus oculi is normal and the pyramidal tracts are not involved. The cerebrospinal fluid has revealed no abnormality except an occasional positive Lange curve. Increases in the β-globulin and sometimes the α-globulin in the serum, when observed, have had to be discounted because they may be noted in New Guinea highlanders unaffected by kuru. Immunological, therapeutic, and chemical studies, including some on copper metabolism, are so far negative.

Pathological findings are confined to the nervous system, where preliminary observations point to a widespread neuronal degeneration with neuronophagia, the parts most affected being the cerebellum and extrapyramidal system and, to a lesser extent, the anterior horn cells, the inferior olives, thalamus, and pontine nuclei.

The Fore people live in a heavily forested terrain, covered with kunai grass, at an altitude of 5000–7000 feet. No toxic substance in the diet, water, soil, or body paints, or anything else in the environment has been found to

1. Gajdusek, D.C., Zigas, V. *New Engl. J. Med.* 1957, **257**, 974.
2. Zigas, V., Gajdusek, D. C. *Med. J. Aust.* 1957, ii, 745.

account for the condition. In fact the evidence is so far in favour of some genetically determined degeneration of the central nervous system, and this is supported by the facts that kuru has been known to develop in several siblings at the same age and that the disease may show the phenomenon of anticipation. A congenital tremor has been seen in two Fore natives and occasional instances of parkinsonism are known in adjacent territories, but these conditions are easily distinguished from kuru. Further information on this striking disease will be awaited with interest, for it may well serve to throw welcome light on unsolved problems of neuropathology.

MEASUREMENT OF BLOOD-PRESSURE IN INFANCY

ALTHOUGH determination of the blood-pressure is not always regarded as a part of the routine examination of infants and children,[1 2] more conditions are now being recognised in which a dependable method of estimation is necessary.[3] For clinical purposes, one of the usual cuff methods (using auscultation, palpation, or oscillometry) can generally be applied, even to newborn babies, and Holland and Young [4] succeeded in measuring the systolic pressure in premature infants weighing as little as 4 lb. by palpation of the brachial artery. The estimation must be made while the infant is quiet, which may mean waiting until he is asleep, or giving a sedative. By comparing the results with those obtained by direct intra-arterial measurement, Robinow et al.[5] showed that if a cuff of suitable width is used (2·5 cm. for newborn and 5 cm. for older babies) sufficiently accurate readings of the systolic pressure can be obtained by ordinary clinical methods, though there are errors in the diastolic readings because of difficulty in hearing the Korotkow sounds. The use of an amplifying stethoscope may make auscultatory determination both easier and more accurate. Where the conventional methods are unsuccessful, the "flush" technique of Gaertner [6] may be used. It depends on the production of reactive hyperæmia by deflating a cuff from a pressure of 300 mm. Hg, at a rate of about 5 mm. per second, on a limb made relatively bloodless distally by compression with an Esmarch or similar bandage. The limb is held at heart level and watched in a good light, and the pressure at which the first flush appears is noted. Since this method was first used in infants by Cappe and Pallin [7] and by Goldring and Wohltmann,[8] a number of reports on it have appeared,[9–13] and it has become an established clinical method.[13]

Average figures for normal brachial pressures in newborn babies are 80/46 mm. Hg, for babies aged six months 89/60, and at one year 96/66;[14] but the flush method gives values 10–20 mm. lower than systolic pressures obtained by palpation, auscultation, or direct measurement—i.e., it gives approximately mean pressures. The arm pressure is normally given as a few mm. higher than the leg by this method,[8] but in 8 cases of coarctation of the aorta the difference was 36–88 mm.[12] The flush method takes longer than conventional methods of sphygmomanometry, and is more likely to make babies cry; but even if they do, according to Forfar and Kibel,[10] an error of only 7–10% is introduced. Schaffer [15] wrote "the flush method is simple but coarse and unreliable," and it is undoubtedly inferior to auscultation when the sounds can be well heard. It is useful, however, for babies whose brachial pulses cannot be felt, and for femoral blood-pressure estimation in suspected coarctation of the aorta.

1. Hunter, D., Bomford, R. R. Clinical Methods. London, 1956.
2. Silver, H. K., Kempe, C. H., Bruyn, H. B. Hand Book of Pediatrics. Los Altos, California, 1957.
3. MacCarthy, D. *Practitioner*, 1955, **174**, 160.
4. Holland, W. W., Young, I. M. *Brit. med. J.* 1956, ii, 1331.
5. Robinow, M., Hamilton, W. F., Woodbury, R. A., Volpitto, P. P. *Amer. J. Dis. Child.* 1930, **58**, 102.
6. Gaertner, G. *Wien. klin. Wschr.* 1899, **12**, 696.
7. Cappe, B. E., Pallin, I. M. *Anesthesiology*, 1952, **13**, 648.
8. Goldring, D., Wohltmann, H. J. *J. Pediat.* 1952, **40**, 285.
9. Reinhold, J. D. L., Pym, M. T. *Arch. Dis. Childh.* 1955, **30**, 127.
10. Forfar, J. O., Kibel, M. A. *ibid.* 1956, **31**, 126.
11. Sullivan, M. P., Kobayashi, M. *Pediatrics*, 1955, **15**, 84.
12. Moss, A. J., Liebling, W., Austin, W. O., Adams, P. H. *ibid.* 1957, **20**, 53.
13. Smith, C. A. *in* Nelson's Textbook of Pediatrics. Philadelphia, 1954.
14. Nadas, A. S. Pediatric Cardiology. Philadelphia, 1957.

F.A.O.

A SMALL book[16] sets out in simple language the problems that the Food and Agriculture Organisation of the United Nations has faced in the first twelve years of its life. These problems still exist, for, as the director-general, R. B. Sen, says in his foreword, "there are today millions of hungry people, there are unused resources, maladjustments of distribution, depressed rural population." Nevertheless, the record is heartening, for F.A.O. has proved a good means of spreading knowledge in underdeveloped countries. The greatest difficulty in its way has been that of getting the necessary cooperation between Governments, especially in economic matters: too narrow a nationalism remains an important hindrance to scientific development. But it is significant that the Governments of the various countries of North Africa have never been so united—or so effective—as when serving as members of the Desert Locust Control Committee, sponsored by F.A.O. National political wisdom may grow on a diet of international scientific knowledge.

NEW YEAR HONOURS

Sir Harry Platt was knighted six years before he became president of the Royal College of Surgeons, and the baronetcy now bestowed on him recognises his three years' tenure of that great and strenuous office, as well as the value, in all his capacities, of his vigour and freshness of mind. The particular reason for Sir Stewart Duke-Elder's promotion to be a knight grand cross of the Victorian Order is presumably his services to the Royal Family, but these are of course only one manifestation of his remarkable services, through ophthalmology, to medicine. Of the new knighthoods, two, in the Order of the British Empire, are conferred on the recently appointed heads of the medical departments of the Royal Navy and the Royal Air Force, Rear-Admiral R. C. May and Air Marshal P. B. Lee Potter. Three of the knights bachelor work in Australasia (Dr. H. R. R. Grieve, Mr. W. G. D. Upjohn, and Dr. Ralph Whishaw) and three in Great Britain. Of Professor Krebs, of Oxford, Nobel prizewinner of 1953 and discoverer of the citric-acid cycle, it has been said that as a leader and teacher he has instilled the element of genius that turns possibilities into realities. Dr. Kenneth Cowan has retained and increased the confidence of his colleagues by his understanding work as chief medical officer of the Department of Health for Scotland. Dr. Bentley Purchase's championship of the difficult office of coroner, as well as his outstanding labours in it, deserve the honour they now receive. These are only the first names of a list which brings forward, for public thanks, much notable work—some of it widely known but much of it done in places where only a few colleagues can be aware of its quality.

15. Schaffer, A. I. *Amer. J. Dis. Child.* 1955, **89c**, 204.
16. Millions Still Go Hungry. Food and Agricultural Organisation of the United Nations. Rome, 1957. Pp. 102. Obtainable from H.M. Stationery Offices. 5s.

Points of View

A PLASTIC APPROACH TO SURGERY

CHARLES HEANLEY
T.D., M.A., M.B. Cantab., F.R.C.S., M.R.C.P.
CONSULTANT PLASTIC SURGEON, THE LONDON HOSPITAL, E.1

THERE is no such thing as a "lucky" surgeon—"the wind and the waves are on the side of the ablest navigator". To be lucky is to know the rules and to know when to break them.

The first rule is that diagnosis should precede treatment, and to disregard this rule is "worse than a crime, it is a mistake". The word "diagnosis" is merely a verbal symbol to represent a living and changing phenomenon; diagnosis in its fullest sense is an understanding of the pathological process present. The making of a diagnosis is a continuous process which does not cease with the start of the operation, but should always be one step ahead of the treatment. It is fatal to cling to an incorrect diagnosis; so, having made a diagnosis, do not stick to it. A plastic outlook is essential. Each case should be treated on its own merits, since no two cases are the same. The man with a rigid method and technique is dangerous: if he says that something is always so, he is either teaching or no surgeon. Since pathological processes change, what was a correct diagnosis at one time may be wrong later. One should start an operation with a working diagnosis, together with a clear conception of the known facts and an open mind.

One learns quickly from one's own mistakes, sometimes too quickly. It is nicer to learn from the mistakes of others. However, it is essential to be able to recognise a mistake, and it may be hard to realise that the result might have been better. Inquisitiveness is an essential attribute of a good surgeon, because inquisitiveness leads to an increase of knowledge; and to know all about a condition is to know its complications, and thus avoid them.

Do not ignore the opinion of the uninstructed; for rude minds sometimes contain pearls of wisdom, and discussion is always helpful, because what is dark when unspoken may become clear when discussed.

Although the diagnosis is correct, it may be difficult to decide on the treatment, because this so much depends on the prognosis. The knowledge of the prognosis of a disease and the assessment of the prognosis in the particular case is essential in deciding the treatment, especially in carcinoma.

So often the problem is not how to do the operation, but what operation to do, since it is the duty of the surgeon to prolong living in comfort, rather than to prolong the discomfort of dying. A clear conception of why one is operating at all, and why the particular operation has been decided upon, should always be kept in mind.

You should not do today in an ill patient what can be done tomorrow or later in a fit patient. Emergency operations should be avoided, if possible: the acute abdomen, for instance, is a Pandora's box of mischief. To an already ill patient do not add the insult of a big operation; he needs a life-saving operation, and no more. Do not try to paint the lily, for a live weed is better than a dead lily.

* * *

The gentle handling of tissues is essential; this rule must not be broken. Avoid lethal surgery, whether it is a cell or the patient that dies. The more dead or dying cells left in an operation site, the slower the recovery. The heavy-handed surgeon who mauls tissues, often with the aid of fierce instruments and retractors, is the one who complicates already elaborate techniques in a vain attempt to reduce the incidence of postoperative sepsis.

There must be no tension, either in the surgeon or in the tissues. Healing is quickest when the tissues lie adjacent to one another without tension or compression. Both these states, which are associated with tight stitching, upset the blood-supply to the healing edge. Sutures should be inserted in such a way that the blood-vessels in the loop of the stitch are not compressed, either at the time of stitching or later when the tissues swell from postoperative œdema: otherwise more trauma is caused, with more œdema and more compression. Whereas a ligature is for hæmostasis, a suture is to approximate tissues until they heal, and a stitch that is inserted to perform both these functions is essentially bad. The stitch that sutures the transverse mesocolon to the stomach in the posterior Polya gastrectomy should be tied so loosely that even if the middle colic vessels are contained in its loop, they are not obstructed. The stitch that sews the peritoneal layer but inadvertently pierces the gut lumen will not slough out. Often the leakage of intestinal contents results from a stitch obliterating the blood-supply to the suture line. I remember a surgeon who, his muscles bulging as he tied his sutures, said: "I can never understand why my colporrhaphies break down—I tie my stitches tight enough."

Each stitch must be inserted and tied as if it were the most important one. Since a successful operation depends on its weakest stitch, each one should have meticulous care. As is seen in skin suture, a badly placed stitch cannot be corrected by any number of rightly placed stitches, so it should be removed at once. If the stitches are loose and soon removed, only the incision will be visible, and not the stitch marks. But stitches can be removed early only if there is no tension and a good blood-supply. On the face, for instance, stitches can be removed in three days, but where the blood-supply is bad, as on the back, they may have to be left in for fourteen days.

By your scars will you be judged—the patient honours the surgeon if the scar is neat, for if the internal malady is cured, what is left save the scar by which to judge the result? A neat suture line may cover a multitude of sins. Incisions should be made in the direction of Lange's lines, which for the most part lie in the flexion creases. If a circle is drawn on the skin, and the circle of tissue is removed, the resultant bare area is larger than the area removed, and is oval in shape, showing that tension, and unequal tension, exists in the skin. Therefore, if the incision is made at right angles to direction of the least tension a good scar results; if it is made in another direction there may be a contracture.

"I shall excise the scar, the whole scar, and nothing but the scar, so help me Hippocrates", is the initiate oath of the plastic surgeon. The resulting defect is sometimes surprisingly large—one removes a pennyworth of scar and gets a shillingsworth of bare area. This is due to the fact that, where the skin is supple, skin defects heal by the contracture of the scar tissue drawing the edges together, rather than by epithelial growth.

* * *

Nature abhors a vacuum, and fills it with a blood-clot; and, as hæmatomata are almost synonymous with wound infection, subcutaneous dead spaces can be obliterated by end-on mattress sutures of non-absorbable material with the loops tied over packs. Some sites are more prone to the formation of hæmatomata than others. Whereas blood-vessels in the face usually stop bleeding naturally, those in the lower abdomen do not; so every miserable bleeding blood-vessel must be ligated. In plastic surgery, pressure dressings are used to press the graft against the recipient area and so prevent hæmatomata. The introduction of the crêpe bandage has been the greatest advance in skin-grafting in the 20th century. To control hæmorrhages, pressure dressings should be left for four days. Six days shall you labour and the seventh is for the evacuation of hæmatomata.

Raw surfaces should not be left exposed, because they granulate and form scar tissue. Scar tissue is feminine in gender, being perverse at all times: it contracts when it should relax, as in strictures, and stretches when it should contract, as in hernia repairs. To say that a wound is granulating well is a contradiction in terms. If, in transplanting a ureter into the colon, it is allowed to prolapse into the lumen, so that the epithelium where the ureter is cut is not in contact with the epithelium of the colon, the outer surface of the ureter will granulate, forming a circular scar which contracts around the ureter and causes urinary obstruction, sepsis, and death; even if the ureter is put into a defunctioned loop of bowel there will still be stricture leading to urinary sepsis. Whitehead's operation for hæmorrhoids fell into disrepute because tension and sepsis led to the separation of the bowel mucous membrane from the skin, and the circular scar led to stricture formation. Some surgeons wonder why their colostomies stenose when they do not suture the mucous membrane to the skin, but the wonder is that stricture is not commoner.

* * *

The best dressing for any raw surface is a skin graft, and the thicker the graft the less the contracture. Repeated dilatations are the signposts of surgical failure, and pull-through methods of anastomosis are bad. The failures of prostatectomy, immediate and delayed, are failures to get immediate epithelial cover.

Hippocrates said, "Do not operate on growths—it makes them worse"; the same rule holds today. One should operate on the normal tissues away from the growth, and not cut across carcinomatous tissue. For the surgeon, the way to hell is paved with short incisions; for the patient the way to heaven is paved with small excisions, particularly in carcinoma surgery. Carcinomata are seldom removed completely, but the growth of those cells that are left behind is held in check by many factors. As the radiotherapist depends on the tissue reaction of the healthy patient for the treatment of carcinoma, so does the general surgeon. The cynic says that in every case of carcinoma of the breast, recurrences will develop provided the patient lives long enough. But the early recurrence appears in the patient who has made a slow postoperative recovery. Therefore she should be kept as fit as possible before, during, and after the operation. Large operations should be avoided wherever possible, because they lessen the general health of the patient and so upset the hormonal control. At the site of successfully treated carcinomata, plastic operations should be avoided lest they liberate carcinoma cells from the scar tissue.

* * *

To be a quick operator is good, but speed must never be gained by the sacrifice of any principles. Thou shalt not worship speed for its own sake, for it is a false god. A quick surgeon never hurries, for speed is not made by overhaste: when you drive a car, a high average speed depends not on how fast you go, but on how slowly you don't go. Delay is due to indecision, which results from incorrect diagnosis, faulty planning, and lack of experience. The repetitive, unproductive movement should be avoided, as in time-and-motion study: the hand that puts down the scalpel picks up the artery clip—in one movement. Time is saved by attention to many details, such as the position of lights, trolleys, and assistants, and by teamwork. Time is saved, therefore, by performing slow, deliberate, economical movements, never unnecessarily repeated. Thus, speed becomes the handmaiden of the surgeon and not his mistress.

Public Health

INFLUENZA IN LIVERPOOL

ANDREW B. SEMPLE
V.R.D., M.D. Glasg., D.P.H.
MEDICAL OFFICER OF HEALTH

J. B. MEREDITH DAVIES
M.D. Lond., D.P.H.
DEPUTY MEDICAL OFFICER OF HEALTH

P. J. DISLEY
M.B. Glasg., D.P.H.
ASSISTANT MEDICAL OFFICER OF HEALTH

CITY OF LIVERPOOL

THE spread of influenza from North China and Hong Kong last spring has been reported from many areas (Mulder 1957, Fawdry 1957, Guthrie et al. 1957, Lim et al. 1957). We describe here its arrival and spread in Liverpool, and compare its course and effects with those of the last sharp outbreak, which attacked Merseyside in January, 1951 (Semple 1951).

Influenza in 1957

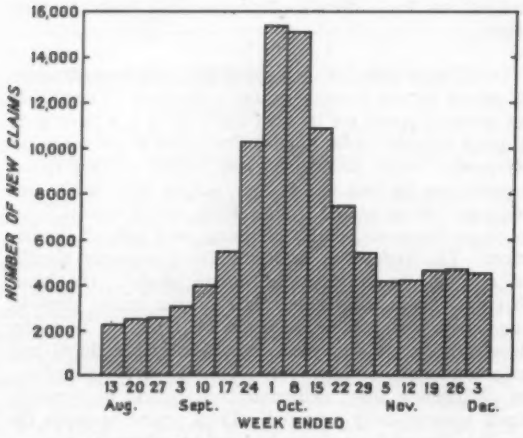
The first influenza patient to reach Liverpool arrived in the s.s. *Clan Chattan* from Calcutta on June 27. 4 more cases were reported in another ship from India on July 1. There was then a break of seven weeks until August 19, when 27 patients arrived in the s.s. *Hellenes* from South Africa. From then until the end of October, 35 ships docked carrying a total of 455 people with influenza. The most heavily infected ship was an Indian naval vessel which docked on Aug. 27, with 252 cases of influenza aboard.

The outbreak in Liverpool started early in September. It seemed to be at its height on Sept. 27 and 28.

Incidence

The spread of the epidemic was studied day by day by collecting information from as many sources as possible, including the first sickness-claim forms, school absences, and sickness returns from industrial firms in the city and from the Liverpool Passenger Transport Department.

The school absence figures rose quickly to a peak on Sept. 27 when the average sickness-rate was 39·6% for infant schools, 40·2% for junior schools, and 50% for senior schools. The



City of Liverpool. Weekly new claims for sickness benefit, 1957.

high incidence was found equally in all areas of the city. The highest rates were among the older children—a finding unusual in widespread illness of a relatively mild nature. Such findings were also noticed in the large independent schools of the city. These independent schools started their term about three weeks later than those of the local education authority, and the peak of attack was also about three weeks later, in early October.

The new claims for sickness benefit collected by the Ministry of Pensions and National Insurance rapidly increased (see figure). Daily figures of new claims from three local offices of the Ministry were telephoned to the health department. The peak of these first sickness claims (see figure), representing the highest incidence in adult insured workers, came in the weeks ending Oct. 1 and Oct. 8. The peak in adults was therefore a week to ten days later than that in the school-children. Figures collected from industry showed similar trends. The daily sickness-rates of three large firms (comprising the passenger transport department, a football-pools firm [employing mainly women], and a large mixed factory) were:

Date	*Sickness* (%)	*Date*	*Sickness* (%)	*Date*	*Sickness* (%)
Sept. 16	8·2	Sept. 28	14·9	Oct. 11	12·0
,, 17	7·6	,, 30	12·2	,, 12	13·7
,, 18	8·6	Oct. 1	13·3	,, 13	11·9
,, 19	8·2	,, 2	13·1	,, 14	10·7
,, 20	8·3	,, 3	11·5	,, 15	9·9
,, 21	10·9	,, 4	14·2	,, 16	9·7
,, 23	11·1	,, 5	16·2	,, 17	9·9
,, 24	11·6	,, 6	15·2	,, 18	10·3
,, 25	11·5	,, 7	13·1	,, 19	7·2
,, 26	10·0	,, 8	12·2	,, 20	8·6
,, 27	12·4	,, 9	12·7	,, 21	8·3
		,, 10	10·6	,, 22	8·2

12,500 employees are represented. By Sept. 16 the sickness-rate was already as high as 8·2%, but it reached its peak on Oct. 5 with 16·2%. An interesting feature of the outbreak demonstrated by these figures was how slowly the absentee-rates in industry returned to normal.

TABLE I—DEATHS FROM INFLUENZA, PNEUMONIA (INCLUDING BRONCHOPNEUMONIA), AND BRONCHITIS

Week ended	No. of deaths (all ages)					
	Influenza		Pneumonia		Bronchitis	
	1957	1956	1957	1956	1957	1956
Aug. 31 ..	—	—	12	11	4	1
Sept. 7 ..	1	—	19	8	6	15
Sept. 14 ..	—	—	11	13	6	11
Sept. 21 ..	—	—	6	6	5	2
Sept. 28 ..	6	—	22	15	11	13
Oct. 5 ..	18	—	19	13	16	11
Oct. 12 ..	25	—	29	11	14	12
Oct. 19 ..	21	—	21	7	10	9
Oct. 26 ..	11	—	42	5	25	4
Nov. 2 ..	5	—	14	—	9	14

TABLE II—COMPARISON OF MORTALITY AND MORBIDITY IN LIVERPOOL IN 1951 AND 1957

Week of epidemic	No. of deaths from				National Insurance new sickness claims	
	Influenza		All respiratory disease			
	1951	1957	1951	1957	1951	1957
P−4	—	—	38	16	2958	3038
P−3	—	1	43	26	2518	3979
P−2	2	—	48	17	1571	5469
P−1	16	—	60	11	9806	10,286
P	85	6	301	39	22,320	15,324
P+1	202	18	476	53	11,447	15,079
P+2	114	25	286	68	6081	10,871
P+3	50	21	118	52	3704	7433
P+4	—	11	89	78	3792	5378

P, " peak week " of highest incidence (not mortality).

Mortality

Mortality figures are given in table I, with the corresponding figures for the same period in the previous year. Deaths reached their peak in the week ending Oct. 12, when they numbered 25. The number of deaths from bronchopneumonia

TABLE III—INFLUENZA EPIDEMICS, 1951 AND 1957: NO OF DEATHS IN AGE-GROUPS

Week ended	Age (yr.)	0–1		1–14		15–54		55–64		65–75		75+		Total	
	Outbreak	1957	1951	1957	1951	1957	1951	1957	1951	1957	1951	1957	1951	1957	1951
Sept. 14, 1957	Total	6	20	1	10	14	28	26	40	37	72	43	74	127	244
Dec. 23, 1950	Influenza	—	—	—	—	—	—	—	—	—	—	—	2	—	2
	Other pneumonias ..	—	3	—	3	—	1	1	3	3	7	7	8	11	25
Sept. 21, 1957	Total	8	13	5	2	21	48	17	56	32	86	37	96	120	301
Dec. 30, 1950	Influenza	—	—	—	—	—	2	—	5	—	7	—	2	—	16
	Other pneumonias ..	—	3	1	1	—	1	1	1	1	5	3	7	6	18
Sept. 28, 1957	Total	5	18	2	7	26	84	40	121	45	218	54	210	172	658
Jan. 6, 1951	Influenza	—	—	1	1	—	8	4	12	—	37	1	27	6	85
	Other pneumonias	—	4	—	3	3	9	4	13	4	27	11	25	22	81
Oct. 5, 1957	Total	7	22	2	12	38	106	41	155	63	273	63	326	214	894
Jan. 13, 1951	Influenza	—	1	1	—	8	27	4	35	2	58	3	81	18	202
	Other pneumonias ..	—	7	—	3	2	13	4	13	4	33	9	42	19	111
Oct. 12, 1957	Total	7	15	1	6	34	52	44	90	62	177	60	241	208	581
Jan. 20, 1951	Influenza	—	1	—	—	9	13	3	22	10	33	3	45	25	114
	Other pneumonias ..	3	7	—	—	4	3	3	10	7	15	12	33	29	68
Oct. 19, 1957	Total	3	12	2	4	23	43	46	40	58	98	66	125	198	322
Jan. 27, 1951	Influenza	1	—	—	—	3	4	6	5	8	19	3	22	21	50
	Other pneumonias ..	—	—	—	1	1	2	4	3	6	7	10	13	21	26

and pneumonia continued to increase the high level of 42 in the week ending Oct. 26, compared with 5 in 1956. This lag between the peak period for incidence and deaths is usual, but there did seem in this outbreak to be a rather longer period of increased respiratory deaths, though they at no time reached exceptional levels.

The weekly mean temperature during the peak of the epidemic was between 52°F and 54°F. This represents a level about 1·5°F below the mean temperature for the time of year—a much smaller variation from normal than during the 1951 outbreak.

Comparison of 1951 with 1957

The outbreaks of 1951 and 1957 were remarkably similar in size but very different in effect (table II). The sickness first claims were very similar: in the four peak weeks of the outbreak in 1951 there were 49,654 claims, compared with 52,560 in 1957. The incidence in children, however, was greater in 1957.

The peak of the 1951 outbreak was at the start of a school term, but the absence-rate in the first two weeks of that term (coinciding with the peak of the outbreak) in all schools in Liverpool was 17·7%. In the 1957 outbreak, the maximum absence-rate for the two peak weeks was 23·1%. This difference is greater than is apparent because the epidemics were at different times of the year. In the 1951 epidemic, the absence-rate was 17·7% in early January, when the normal figure would be 12·2%, and in the 1957 epidemic the rate was 23·1% compared with a normal figure for late September of 8·3%.

The most striking differences were in the death-rates. (table III). The number of deaths from influenza for the six worst weeks in 1951 and 1957 were 469 and 81 respectively. The figures for the worst single week are even more striking—202 deaths in 1951 compared with 25 in 1957. These findings are repeated to a less extent with the "other pneumonia" deaths, 329 in 1951 and 143 in 1957.

There is evidence that the 1951 epidemic attacked a much larger proportion of older persons in the community: in 1951 the old persons' homes in the city were very heavily attacked, whereas in 1957 they almost entirely escaped (only 33 cases of a population of 1351 old persons in the hostels). This would account to some extent for the much lower mortality-rate in 1957, but the season of attack must also have played a part in reducing mortality in 1957.

It would be interesting to know whether, in 1957, people over 50 years old escaped illness because they had already been exposed—perhaps in 1918—to a virus of similar strain.[1] Perhaps this question can be answered by observing what happens in January and February, 1958, if a second wave appears.

Summary

The large influenza A outbreak in Liverpool in September/October, 1957, is described and compared with a similar influenza A outbreak in 1951.

Numerically the outbreaks were similar, but in 1951 there was a much higher death-rate and evidence of many older persons being attacked. In 1957, the outbreak was much milder and attacked young people, especially schoolchildren.

REFERENCES

Fawdry, A. L. (1957) *Lancet*, ii, 335.
Guthrie, J., Forsyth, D. M., Montgomery, H. (1957) *ibid.* p. 590.
Lim, K. A., Smith, A., Hale, J. H., Glass, J. (1957) *ibid.* p. 791.
Mulder, J. (1957) *ibid.* p. 334.
Semple, A. B. (1951) *Med. Off.* **86**, 259.

1. Since this account was written, the virus responsible for the recent outbreak has been isolated as A/England/660/57, and is of Asian type.

THE PUBLIC HEALTH IN 1956

Chief Medical Officer's Report

A YEAR ago[1] we quoted Sir John Charles' pleasant account of the weather of 1955, and predicted a less happy account for 1956. In his report on the health of England and Wales for that year,[2] Sir Charles tells of the London fog of Jan. 4–7 and the thousand extra deaths that followed it; of the "summer" ("no summer since 1880 was colder and wetter and duller"); and of the fog that covered the country from Dec. 19 to Dec. 23. But, as he points out, man adapts himself to extremes of climate, and the death-rate remained steady at 11·7 per 1000, the infant-mortality rate reached a record low level of 23·7 per 1000 (though the rate of 14·0 in one borough indicates that there is room for improvement), and the number of deaths due to pregnancy and childbirth (including abortion) was 399, the smallest number on record (toxæmia is responsible for many of the deaths, and for much of the perinatal mortality).

THE CANCERS

The heading of the chapter on the malignant diseases is now given a title in the plural, to signify the growing belief that it is more useful to regard them as a group of diseases with a common link rather than as a single disease. Some industrial cancers have been almost eliminated; and knowledge or suspicion of the causes of many other cancers gives hope that their incidence may eventually be reduced.

The number of cancer-registration bureaus is increasing; this will help to give a truer picture of the morbidity, as distinct from the mortality, of the cancers; but at present trends can be discerned only from the death-rates. The comparative mortality index shows the change in the death-rate from a disease, compared with the rate in 1938, corrected for changes in the size and age-structure of the population at risk; it is a better guide to long-term changes of prevalence than the uncorrected numbers of deaths. The index for cancer steadily increased in men from 1·0 in 1938 to 1·17 in 1956; in women it steadily decreased to 0·91. Compared with 1955, the total number of deaths from cancer increased by 775 in men and 595 in women. In men the number of deaths from most gastro-intestinal cancers declined, and most of the increase was due to cancer of the lung (794 deaths), prostate (225), bladder (61), and lymphatic and hæmopoietic tissue (53). In women the striking increases were in cancer of the lung (120 deaths), breast (85), and uterus (82), and in leukæmia (85 deaths). The incidence of leukæmia has risen more sharply in the past 25 years than that of any other disease except coronary thrombosis and lung cancer, though part of the increase may be apparent, and attributable to better diagnosis. The part played by radiation in its cause has been convincingly shown in survivors of atomic-bomb explosions and in patients treated for ankylosing spondylitis, and less definitely in radiologists and in children whose mothers were radiographed during pregnancy. But post-irradiation leukæmias have been chiefly acute or myeloid rather than lymphatic, whereas chronic lymphatic leukæmia has contributed much to the increase; and the proportion of cases of leukæmia in which radiation can be definitely incriminated is small.

Deaths from lung cancer continue to increase in number (from 1955 to 1956, by 5·4% in males and 4·9% in females). Though in certain occupations (the mining of radioactive ores, the refining of nickel, and the manufacture of asbestos, chromates, and coal-gas) the workers have an increased risk of lung cancer, the two main causal factors against which evidence is substantial are cigarette-smoking and atmospheric pollution. Many reports confirm the association between cigarette-smoking and lung cancer—particularly the squamous-celled

1. *Lancet*, 1956, ii, 1302.
2. Report of the Ministry of Health for the year ended Dec. 31, 1956. Part II. On the State of the Public Health. H.M. Stationery Office. Pp. 262. 9*s*.

variety. Figures obtained from the mortality among doctors indicate that, even for heavy smokers, the risk of lung cancer developing is lessened if smoking is given up; habitual smokers are deprived of the consolation of " it's too late to stop now ". Sir John comments: " It's never too late to mend!" The Government have undertaken to see that the public are kept informed about this relationship. Urban life, with its exposure to a polluted atmosphere, may be the explanation of the higher incidence of lung cancer in New Zealand among recent immigrants from Britain than in non-Maori natives.

CLEAN AIR

Lung cancer is only one of many disorders attributable, in part at least, to atmospheric pollution. Sir John welcomes the Clean Air Act of 1956, which sets up a council to advise on clean-air policy, increases the powers of local authorities over the emission of industrial smoke, and empowers the Minister of Housing and Local Government to declare smoke-control areas, thus easing the burden on local authorities. These measures may help to dissipate what Evelyn called " the hellish and dismal cloud of seacole " over our cities. Meanwhile fog-masks can be prescribed under the National Health Service, and in London certain hospital beds are reserved for patients suffering from the effects of fog. Warnings are broadcast when serious fog is predicted.

MENTAL ILLNESS

Admissions to hospital for mental illness increased by 5341 to 88,189, but the number in residence fell by 1353 to 149,219. 64,011 mental-deficiency patients were under care. Outpatient attendances increased from 714,014 to 762,072; many treatments, including shock, psychotherapy, and abreaction are now given in outpatient departments, and more emphasis is now being placed on keeping patients out of hospital. For many patients, day hospitals, night hospitals, or short-term inpatient care is best, but others still need long-term admission. Even " chronic " patients can often be reclaimed and sometimes return to society. Physical treatments (including tranquillising drugs) have helped to make group re-education and occupation possible. The result has been that more and more wards have been unlocked—every ward in several large hospitals. Patients who formerly vegetated in confinement can now move freely, enjoy recreation, and undertake employment.

Mentally deficient children who have to be cared for in institutions may suffer from being deprived of their mothers. In some hospitals nursing assistants or older girl patients (under supervision) have acted as substitutes. Where possible children are sent home for holidays; conversely, children cared for at home may be admitted for short periods to give the parents a break.

Medical officers of health are increasingly acknowledging their responsibilities in preventive psychiatry, through the maternal and child-welfare, school-health, and health-education services.

ACCIDENTS

Another responsibility of the local authorities lies in the prevention of accidents, particularly in the home. Health visitors and public-health inspectors, in particular, are in a position to detect hazards in the home and suggest remedies. 6908 deaths resulted from domestic accidents, 688 of them in children under 5 years and 5039 in people over 64. Since 1951, the number of deaths has increased in old people and fallen (by 26%) in the under 5's. A survey quoted in the report indicates that less than a third of home accidents are caused by environmental factors (bad design, or, more often, lack of maintenance). Some people are accident-prone; thus an American transport company transferred 5% of their drivers with high accident-rates to static work; the number of accidents then fell to a fifth.

There has been no decrease in the fatalities from clothing catching fire. A British Standards specification for a fireguard (B.S. 2788), published in 1956, provides for fixation to the wall by hooks and provision for refuelling and removing ash with the guard in place. Cellulose materials (especially cotton, flannelette, and winceyette) and flowing garments (especially stiffened underskirts) present the greatest hazard. Materials with an anti-flame finish are on sale. The report does not deal with transport or industrial accidents.

TEETH

In their reports, very many school medical officers have expressed concern at the poor and deteriorating state of children's teeth. The increasing scarcity of dentists draws attention to the importance of two ancillary dental workers—the hygienist and the dental nurse. The Dentists' Act, 1956, permits the employment of hygienists in private practice (formerly they were confined, in this country, to the Forces and the public-health service); their work is scaling and polishing, and instruction in care of the teeth. Dental nurses, now confined to New Zealand, are employed in the public-health service, where their work is the conservation of children's teeth. The 1956 Act provides that the " Privy Council may direct the General Dental Council to conduct an experiment in their training and use ".

As experiments in North America have shown, fluoridation at optimal levels reduces the liability to decay, and fluoridation experiments are in progress in four areas of England and Wales. The experiments involve the periodic examination of 12,000 children; at the first examination over 90% had dental caries.

DISABILITIES

During 1956 the total number on the blind register increased by 1336 to 96,019. These are persons " so blind as to be unable to perform any work for which eyesight is essential ". 3·6% were totally blind and 11·1% had perception of light only. In 80% of cases the cause is unknown. The cause of retrolental fibroplasia was made known in 1953, but the incidence in children aged 0–2 in 1954–56 was half that in 1951–53; altogether 47 cases were registered in 1956.

The prevalence of otitis media has been much reduced, and the commonest cause of deafness in adults is otosclerosis. This can often be treated successfully by operation or a hearing-aid. A much smaller all-transistor aid should be available soon.

Congenital deafness, even if not total, may make a child seem backward, and a scheme has been devised whereby children may be tested in the first year of life: early training may give the child a better chance of overcoming his handicap.

The demand for artificial limbs does not abate. 82% of amputations were for disease, chiefly arteriosclerosis and diabetic gangrene; 13% of the patients with disease had cancers. Trauma, most commonly industrial and motor-cycle accidents, accounted for 18% of the amputations. Training is a particularly important part of the work of artificial-limb centres. Patients as old as 90 have been successfully fitted; 50–60% of patients over 60 became fully independent.

INFECTIOUS DISEASES

Typhoid fever " no longer constitutes a public health problem ", though occasional cases arise, some from infected cockles. But the number of cases of dysentery, nearly all Sonne, increased by a third to 49,009. Most cases were mild (there were 33 deaths) and conurbations were affected more than rural districts. 11,000 cases of food-poisoning were reported to the Registrar General, but 18,500 came to notice through local health authorities and hospitals. These represented 7713 incidents (8961 were detected in 1955), and 44 people died (22 with *Salm. typhimurium* infections). Processed and made-up meats were the prime vehicles.

Measles was in its biennial phase of minor incidence, and the low fatality ratio (0·2 deaths per 100 notifications) suggests that its killing power is weakening.

There is a growing demand for laboratory investigation of virus diseases. This is more time-consuming and costly than bacteriological investigation. 819 strains of poliomyelitis virus were isolated and typed, but " this represents only a fraction of what will be required if our knowledge of viruses is to be rendered adequate for the purposes of clinical identification and for the development of methods of epidemiological con-

trol". Except for smallpox and now poliomyelitis, the control of virus diseases has so far proved impossible. Of the lately discovered agents, the adenoviruses were identified more often, sometimes in cases where non-paralytic poliomyelitis had been diagnosed. Types 1, 2, and 5 are usually found in tonsils or adenoids, and types 3, 4, and 7 in association with acute febrile respiratory illnesses. The evidence suggests that they are not at present of great epidemiological significance; but vaccines prepared from them have been found to reduce the incidence of respiratory infections in troops. There was another, much smaller, outbreak of encephalomyelitis at the Royal Free Hospital, and there were small outbreaks and sporadic cases elsewhere with no deaths. There were 173 notifications of "acute encephalitis" with 106 deaths. 137 deaths were ascribed to poliomyelitis. Virological tests indicate that many cases notified as non-paralytic poliomyelitis (1483 out of a total of 3200 in 1956) were really cases of Coxsackie or other virus infections. A beginning was made in the large-scale immunisation of children; 140,013 were given two injections.

In 1956 there were no deaths from smallpox and 8 (the lowest figure recorded) from diphtheria. The proportion of babies vaccinated in various county boroughs ranged from 2·7% to 74·9%, and of babies immunised against diphtheria from about 30% to 70%. The size of the immunisation index seems to depend more on the enthusiasm and vigilance of the local health authority than on family and social attitudes. (The occurrence of 2 cases of smallpox in 1957 indicates that the danger still exists.) B.C.G. vaccination is being given to increasing numbers of people, especially schoolchildren; a promising new freeze-dried vaccine has been under trial. In this country, however, the spectacular decline in deaths from tuberculosis, and now notifications (deaths decreased by 17% and notification by 7% from the previous year), is to be attributed less to vaccination than to epidemiological methods (such as the detection, isolation, and treatment of infected persons and examination of contacts) and effective treatment, especially chemotherapy. An encouraging feature of the decline in notifications is that it is most evident in the younger age-groups, which augurs well for the future. The highest death-rates from tuberculosis are now in the age-groups 65–69 for men and 75–79 for women.

Chemotherapy is also largely responsible for the fall in the fatality ratio of meningococcal infections (now steady at about 18%, perhaps because many cases are missed in the early stages), and for much of the fall in the number of new cases of venereal disease since the peak year, 1946 (by about 80% for syphilis and 60% for gonorrhœa). But after reaching low levels in 1955 and 1954 respectively, both these diseases are now becoming commoner, as are non-gonococcal urethritis in men and trichomonas vaginitis in women. Most infections are not in immigrants or prostitutes. Gonorrhœa "is clearly not under control, and one reason for this has been the tendency to play down its importance by over emphasising the power of penicillin . . . it now seems likely that in some areas strains of gonococci partially resistant to penicillin may be coming into circulation".

Sir John refers also to the "perplexing problem" of staphylococci resistant to antibiotics, which are dangerous in their own right and, by producing penicillinase, enable hæmolytic streptococci "to resume their former place as public enemies No. 1 of the operating theatre". He attributes the increasing proportion of resistant strains to the indiscriminate use of penicillin in unsuitable conditions.

THERAPY

Sir John makes few comments on treatment, but indicates some further examples of its misuse. Thus, though some tranquillising drugs are undoubtedly useful in the treatment of severe psychoses, they may give rise to severe and even fatal toxic reactions, and are often disappointing in the treatment of the simple common emotional disorders for which they are very often prescribed.

702,593 bottles of blood were issued by the regional transfusion centres in 1956—6% more than in 1955 and 90% more than in 1949. "It seems possible that part at least of the increase is caused by a less discriminating use of transfusion, and it is difficult not to conclude that some transfusions are given unnecessarily." This would be serious enough if the only disadvantage of excessive transfusion were the dangers of the method and the cost of the necessary organisation; but it seems that we are near the point where a further increase in demand will not be met by an equivalent increase in the donor panel. 12% of the blood collected was contributed by British and American Forces stationed in this country.

Infectious Diseases in England and Wales

Disease	Week ended December			
	7	14	21	28*
Diphtheria	1	3	2	5
Dysentery	576	669	610	419
Encephalitis:				
Infective	1	—	3	2
Post-infectious	—	1	2	2
Food-poisoning	146	128	160	95
Measles, excluding rubella	2214	2450	2435	2022
Meningococcal infection	29	34	27	19
Ophthalmia neonatorum	14	19	22	16
Paratyphoid fever	6	11	9	4
Pneumonia, primary or influenzal	649	778	703	755
Poliomyelitis:				
Paralytic	61	53	33	21
Non-paralytic	20	18	18	2
Puerperal pyrexia	188	233	166	138
Scarlet fever	723	795	683	576
Smallpox	—	—	—	—
Tuberculosis:				
Respiratory	510	507	467	301
Meninges and C.N.S.	7	6	7	1
Other	65	39	35	28
Typhoid fever	3	—	2	4
Whooping-cough	575	504	452	257

*Not including late returns.

Medicine and the Law

Is Automatism a Defence to Crime?

IN recent years much of the discussion on criminal responsibility has centred on the death penalty for murder. This particular controversy will no doubt abate now that there is the defence of diminished responsibility and the death penalty has been abolished for certain murders; but there remains both scope and need for further medico-legal discussion of the element of intention in criminal liability. The case of Hill *v.* Baxter [1] raised—but left unsettled—the question whether automatism is a valid defence to a criminal charge.

The defendant had been charged with dangerous driving. The magistrates concluded that, after a certain point, he was not conscious of what he was doing, and inferred that he was then incapable of forming any intention as to his manner of driving. They therefore dismissed the charge. On the prosecution appealing, the Lord Chief Justice said that the magistrates evidently meant that the driver was in a state of automatism. His Lordship observed that there was no case in either English or Scottish law in which the defence of automatism had been set up or been the subject of judicial decision. In the present case, his Lordship was content to rest his judgment on the ground that there was no evidence which justified the magistrates' finding that the defendant was not fully responsible in law for his actions, and that his intention was immaterial because the prohibition against dangerous driving was

1. *Lancet*, Jan. 4, 1958, p. 47; *Times*, Dec. 20, 1957.

absolute. Mr. Justice Devlin also thought there was no need in the present case to determine just what part automatism played in liability for crime; it was a novel point and the answer would depend, among other things, on the nature of the liability which the prosecution had to establish.

In establishing criminal liability, the question of intention may enter in what the lawyer regards as two different contexts. One basic rule applies to all criminal offences—namely, that the accused must have committed an act prohibited by the law or he must have omitted to do something required by the law. Furthermore, this act or omission must have been voluntary. An involuntary act or omission is one which is not willed, and Halsbury's *Laws of England* give the following examples:

"... an act done by a person in a state of unconsciousness, as in sleep, or by a person of such tender years or in such a state of idiocy or insanity that he has, or is deemed to have no mind and therefore no will, or by a person who is constrained by overwhelming force. An act or omission is voluntary in this sense if it might have been avoided by the exercise of reasonable care."[2]

In the case of many criminal offences, it is also necessary that the accused should have been guilty of a legally blameworthy condition of mind known as *mens rea*. This element is essential in all the common-law crimes with one exception, but is not regarded as essential in some statutory offences. Thus, as the Lord Chief Justice pointed out, in the offence of dangerous driving the intention of the driver is immaterial; even an honest error of judgment may render a motorist guilty of dangerous or careless driving. Where *mens rea* is an essential element, proof of guilty intention rests in the first place upon the prosecution; in many cases, however, the facts themselves will raise a presumption that the accused had a guilty intention, in which case it will be upon him to rebut the presumption.

It would seem—particularly from Mr. Justice Devlin's judgment—that a plea of automatism might be relevant in establishing that an act or omission was involuntary in the sense considered above, or in disproof of *mens rea* where this is an element in the offence. In either case, it would seem obligatory upon the defence to produce some evidence of automatism, though the degree of proof might vary according to the nature of the defence. If the defence is that the act or omission was not "voluntary", the court might require a higher standard of proof than in a case where the defence is a denial of *mens rea*.

Medical Reports in Criminal Proceedings

In civil proceedings the use of agreed medical reports is a recognised practice which saves both time and expense. One would suppose that a similar procedure could be adopted in criminal cases, but apparently this is regarded as improper. In Hill *v.* Baxter [3] a bench of magistrates considered the charge of dangerous driving. The defence produced two letters from a doctor dealing with the defendant's condition; the prosecution had no objection to these letters and they were accepted by the magistrates. This procedure was condemned by the Lord Chief Justice. Agreed medical reports, he said, have no place in criminal courts, where evidence must be given on oath and be subject to cross-examination unless there is a statutory exception allowing documents or certificates to be put in.

2. 3rd ed., vol. 10.
3. *Times*, Dec. 20, 1957.

Special Articles

NEW YEAR HONOURS

THE list of honours published on Jan. 1 contains the names of the following members of the medical profession:

Baronet

Sir HARRY PLATT, M.S. Lond., M.D. Manc., F.R.C.S.
Lately president, Royal College of Surgeons of England; emeritus professor of surgery, University of Manchester.

G.C.V.O.

Sir STEWART DUKE-ELDER, K.C.V.O., M.D., D.SC. St. And., F.R.C.S.

K.B.E. (Military)

Air Marshal PATRICK BRUNTON LEE POTTER, C.B.E., M.D. Sheff., Q.H.S.
Director-general, Royal Air Force Medical Services.

Surgeon Vice-Admiral ROBERT CYRIL MAY, C.B., O.B.E., M.C., F.R.C.S., Q.H.S.
Medical director-general of the Navy.

Knights Bachelor

KENNETH COWAN, M.D. Belf., M.R.C.P.E., Q.H.P.
Chief medical officer, Department of Health for Scotland.

HERBERT RONALD ROBINSON GRIEVE, M.B. Sydney.
Member of the New South Wales medical board.

HANS ADOLF KREBS, M.A. Cantab., M.D. Hamburg, F.R.S.
Whitley professor of biochemistry, University of Oxford; director of the Cell Metabolism Research Unit, Medical Research Council.

WILLIAM BENTLEY PURCHASE, C.B.E., M.C., M.B. Cantab.
Coroner, H.M. Household and northern district of London.

WILLIAM GEORGE DISMORE UPJOHN, O.B.E., M.D., M.S. Melb., F.R.C.S., F.R.A.C.S.
Consulting surgeon, Royal Melbourne Hospital.

RALPH WHISHAW, C.B.E., M.B. Sydney, F.R.C.P., F.R.A.C.P.
Physician, Royal Hobart Hospital, Tasmania.

C.B. (Military)

Major-General DOUGLAS BLUETT, O.B.E., M.B. Dubl., Q.H.P.

Air Vice-Marshal FREDERICK ELVY LIPSCOMB, C.B.E., M.R.C.S., Q.H.P.

Surgeon Rear-Admiral ERIC THOMAS SUTHERLAND RUDD, C.B.E., M.B. Dubl., F.R.C.S.E.

C.M.G.

DONALD DIXON MCKENZIE, M.B. N.Z., F.R.C.S., F.R.A.C.S.
Senior surgeon, Auckland Public Hospital.

C.B.E. (Military)

Group-Captain HUGH CUTHBERT SUTCLIFFE PIMBLETT, M.D. Durh., R.A.F.

C.B.E. (Civil)

ALEXANDER BROWN, M.B. Edin., F.R.C.P.E.
Professor of medicine, University College, Ibadan.

TREWAVAS PEARCE EDDY, M.R.C.S.
Director of medical services, Sierra Leone.

GORDON LILICO, M.B. Edin.
Lately a principal medical officer, Ministry of Health.

JOHN CAMPBELL MCINTYRE MATHESON, D.S.O., M.B. Glasg.
Principal medical officer, H.M. Prison, Brixton.

LAMBERT CHARLES ROGERS, V.R.D., F.R.C.S., F.R.A.C.S., F.A.C.S.
Professor of surgery, University of Wales.

SEYMOUR COCHRANE SHANKS, M.D. Glasg., F.R.C.P.
Director, X-ray diagnostic department, University College Hospital, London.

CLARENCE EDMUND SMITH, L.M.S. Singapore.
Assistant director of medical services (tuberculosis), Singapore.

Lieut.-Colonel GEORGE HENDERSON STEVENSON, O.B.E., M.C., M.B. Edin., F.R.C.S.E.
Lately chairman, executive committee, British Red Cross Society (Scottish branch).

EDWIN ALFRED TRIM, O.B.E., M.D. Cantab.
Director of medical services, Uganda.

O.B.E. (Military)

Surgeon Lieut.-Commander DAVID GEOFFREY DALGLIESH, M.R.C.S., R.N.

Squadron-Leader JOHN ERNSTING, M.B. Lond., R.A.F.

Lieut.-Colonel CHARLES MCNEIL, M.B. Cantab., R.A.M.C.

O.B.E. (Civil)

FRANK RICHARD ASHTON, M.B. Edin.
Medical superintendent, Nethersole Hospital, Hong Kong.

CHARLES BOWESMAN, M.D. Dubl., F.R.C.S.E.
Formerly specialist (surgery), Ghana Ministry of Health.

HAROLD CRAWFORD, M.B. Melb., F.R.A.C.S.
Orthopædic surgeon, Children's Hospital, Brisbane,

KATHERINE MARY HIRST, M.B. Lond.
A senior medical officer, Ministry of Health.

THOMAS VICTOR HUMPHREYS, M.B. Belf.
Lately first secretary and medical officer, H.M. Embassy, Moscow.

REUBEN JACOBSON, M.B. W'srand
Director of medical services, Basutoland.

LEONARD ROSS MALLEN, M.B. Adelaide, J.P.
Medical practitioner, Lower North District, South Australia.

PAN TSOH CHIN, M.B.
For social welfare services, North Borneo.

IVAN SAMUEL PARBOOSINGH
Senior medical officer, Jamaica.

JOHN PATRICK SEXTON, M.B. Edin.
Regional senior health officer, Northern Region, Nigeria.

CLARENCE EDMUND SMITH, L.M.S.
Assistant director of medical services (tuberculosis), Singapore.

JOSEPH STANLEY THOMAS, M.R.C.S., J.P.
General practitioner, East Ham.

THOMAS JAMES RUSSELL WARREN, M.B. Dubl., F.R.C.S.E.
Director, Samaritano Hospital, São Paulo.

PHILIP RANDAL WOODHOUSE, D.S.O., M.C., V.D., M.B. N.Z.
President, New Zealand Catchment Boards' Association.

M.B.E. (Civil)

GEORGE FRANCIS NICHOLAS ANDERSON, M.B. Dubl.
Senior medical officer, Iraq Petroleum Company in Qatar.

ELIZABETH ABIMBOLA AWOLIYI, M.R.C.P.I.
Medical officer, Federation of Nigeria.

ABRAHAM JOHANNES PETRUS COETZEE, M.R.C.S.
Chief medical officer, Rhokana Corporation, Northern Rhodesia.

GEORGE MILLAR EDINGTON, M.D. Glasg.
Formerly specialist pathologist, Ghana Ministry of Health.

IRENE ELIZABETH BEATRICE IGHODARO, M.B.
For social welfare services, Western Region, Nigeria.

FRANK STANISLAUS LE MERLE
Lately medical practitioner, Basra.

LATIMA KAMYA MUSOKE
Medical officer, Uganda.

OLIVE HOPE ROBERTSON, M.B. Edin.
President, Federation of Women's Institutes, Southern Rhodesia.

JAMES SCOTT ROBINSON, M.R.C.S.
District medical officer, Dominica, Windward Islands.

CYRIL AUGUSTUS WALLACE, M.B. Belf.
Medical officer, Tanganyika.

In England Now

THE reminiscences of the elderly can be tedious, but those of Uncle Edward, now rising 93, have a stark simplicity which amply repay the annual visit. Last year's was about the benevolent rat he had once observed piloting its blind mate along a gutter by means of a straw held between its teeth. This year Uncle set the ball rolling by remarking innocently that he had just received a Christmas card from Eric Little. "He has sent me one regularly for over fifty years." So we dutifully asked who Eric Little was. But Uncle was not to be hurried. It appeared that in 1887 when he was senior obstetric officer at his alma mater a colleague in practice nearby had sent him an S.O.S. because he was having difficulty in delivering the baby of an elderly primigravida. "And no wonder," said Uncle, "because it was not an ounce under twelve pounds." However it appeared that Uncle was quite used to landing twelve-pounders, and he was soon able to hand the baby over to the gamp and turn his whole attention to the mother who was having repeated convulsions which were rather worrying. Here again Uncle's skill prevailed, though it was some two hours before his unspecified therapeutic efforts were rewarded, and he could turn once more to the baby. "But the baby is dead, Doctor, it was born dead." "Nonsense," said Uncle, "where is he?" It transpired that the baby had been tidily wrapped in brown paper and deposited on top of the dustbin. Uncle lost no time in retrieving his charge and divesting it of its make-shift shroud. "It certainly looked white and was not breathing, but through my stethoscope I could hear the heart, ten beats to the minute and very muffled." So Uncle, undismayed, proceeded vigorously to apply a method, again unspecified, of resuscitation, which, he avers, is known in the hospital to this day as MacGillicuddy's method of reviving the apparently dead. For the third time his virtuosity was crowned with success. The baby turned blue, then breathed, and finally bellowed. "And soon I was able to place Eric Little in his mother's arms, and hence the Christmas card. No, no, his mother never told him the truth—she simply said it was a miracle." Uncle ended modestly.

* * *

Well 1958 has certainly come in with a bang. There's the geophysical jamboree at the Pole, there's Sputnik I hourly getting nearer, and above all Mr. Fairbrother has pain in his chest on exertion. Antarctic news has not unnaturally left most people cold; Sputnik I is best forgotten; but Mr. Fairbrother's catastrophe has hit the great British Public where it hurts most. It stands to reason that if a hero of the Light Programme gets pain on climbing hills and is to have a E.C.G. then something is bound to happen. After all what is good enough for him is good enough for the Common Man and the next thing we will find will be our dyspeptics scorning our mag. trisilicate and demanding specialists and E.C.G.s galore. The Light was friendly when I phoned to plead for a change in the story before Mr. Fairbrother was actually in extremis. It saw my point. It thanked me for phoning, but it promised nothing.

That night one of my coronaries sprang an embolism. Next evening two had relapses. It may mean nothing, but perhaps it does.

* * *

In Calgary the Christmas and New Year campaign against people who drive cars when they are not fit to do so is again being widely advertised,[1] and once again the police will DRIVE-YOU-HOME if you are "impaired" and ask for help. No names will be named, and no charges will be laid. This campaign has helped greatly to lessen the recurring toll among merrymakers, and this year the men who man the petrol pumps are going to help by offering coffee and doughnuts free along with the gas and oil at service-stations in Regina and Saskatoon, and probably in Calgary as well. They hope that the fluid balance will be so well maintained that nobody will be tempted

1. See *Lancet*, 1957, i, 95.

to take an alcoholic "one for the road". The most dreadful penalties are promised to anybody who disregards this friendly help and is found in charge of a vehicle at less than his best.

* * *

When you go to call at a Fire Station it is important not to ring the wrong bell. If you make a mistake and press the one marked "Fire" instead of the more inconspicuous one, unmarked, for casual visitors, you will be confronted by a speedy and impressive turnout of the brigade (penalty £5). However, this didn't happen to me the other evening when I went round to our local station to conduct the firemen's annual first-aid examination; for I met one of the firemen outside and he conducted me safely in, past a glittering array of escapes and pumps, and through to the office. Here, while the final preparations were being made in the examination room, the station officer and I had an interesting conversation on chimney fires, fires, big fires, and really good big fires. I asked what would happen if an alarm came in during the examination. The men would all have to dash off, I was told, some to go out on the pumps and the rest to stand by. However, it might only be a small fire in which case they would soon be back. Just at that moment there was a deafening clanging of bells. "That's not a fire," said the station officer reassuringly. "It's only the signal for changing the watch." The examination proceeded apace. The firemen knew all the answers, and performed the practical tests with alacrity. They were jolly good first-aiders; as good as they must be at putting out fires.

Afterwards they plied me with cups of tea and we discussed one problem that firemen and doctors have in common—the best way of ensuring that a motor will start up quickly from cold on a winter's night. Their method was to have a minute immersion-heater in the cooling system and it seemed to be effective. Then I went on to look at fire-engines and the marvellous gadgets they carry. Pumping water on to a fire seems to be only one of their many functions. There were crowbars in variety, pickaxes, strong wooden bars for levering and breaking down doors, winches, rockets, and on one vehicle a complete workshop on wheels. We ended up with a highly technical discussion on breathing apparatus. It was an interesting evening even if we didn't have a fire.

* * *

It was Teneriffe. The rain fell heavily outside, my friends had gone, and I was all alone. The two ladies who sat in the drawing-room with me seemed rather dull I thought; one was American, the other German. The American said in a gentle voice, "I went to see the five lions. My friend (here she motioned towards the other woman) is not well." I sat up straight and gasped. "And has she got five lions?" I asked. "Certainly," the American replied gently; the German lady looked soulful. The American told me there was a circus on show in Teneriffe, and the lions were the special job of the German lady who spoke no English. This evening this contemporary Una boarded a ship for Barcelona. I lay awake all night picturing her five-day voyage with five seasick lions.

* * *

ANTIBIOSIS IN EXCELSIS (OR MEGALOMYCIMANIA)

O practitioners of medicine, harken to the fevered jibe
Of multitudes of chemists in the land.
Pseudotherapeutic rubbish they suggest that we prescribe
To reduce an inflammation of the hand.

There're the "sulphas" and the "penins" and a jolly fungistatin
And some schizophrenomycins in a host,
Lying on the breakfast table or upon the front-door mattin'
When a fellow only wants to eat his toast.

"Alphamycin V's a wonder drug that doesn't change your sex,"
"Megamycin is no cause of flux profuse"
—We suspect drug combinations with no fetid side-effects
And scant, if any, therapeutic use.

Now it's odd that it should happen in a scientific age,
When we fancy facts and figures are before us,
That the druggists' deep deceptions are becoming all the rage
In a Monumentomycigenic chorus.

Letters to the Editor

SURGERY OR RADIUM FOR CANCER?

SIR,—May we congratulate the team from the Chelsea and Royal Marsden Hospitals on the establishment of their joint clinic, which all agree is ideal for the care of patients with carcinoma of the cervix. We were interested in their overall results for the treatment of stage-I and stage-II carcinoma for the period 1944–50.

We feel, however, that Mr. Blaikley[1] and his colleagues do not do justice to surgery, in that they do not offer sufficient proof that it lags far behind radiotherapy in the treatment of stage-I and stage-II carcinoma. As we read the report this surgical gloom seems to arise from a comparison between their radiotherapeutic results and the surprisingly poor results from surgery from Wertheim's hysterectomy (1933–51, surgeons not named):

	No. of cases	*5-year survival*
Stage I	46	16 (35%)
Stage II	30	10 (33%)

In their discussion the writers make no mention of modern surgical results for the treatment of stage-I and stage-II cancer. Meigs,[2] for instance, records a five-year survival-rate for stage-I cancer of 81%, and for stage-II 60%. We were also disappointed that Victor Bonney, a famous Chelsea man, was not mentioned in this appraisal of surgery. Although his results were recorded without using the formal staging of the League of Nations Health Organisation, his 500 Wertheim operations stand out as a classical achievement. He was able to show a five-year survival-rate of 22% with proven involvement of pelvic lymph-nodes and 53% five-year survival when the nodes were not involved.

Mr. Blaikley and his colleagues write:

"The results of radiotherapy in stage-I cases are of interest because the overall five-year survival-rate of 60·4% is disappointingly low and shows less improvement than in the other stages; it has to be compared with the figure of 65·1% obtained by Wertheim's hysterectomy. However, for the radiotherapy group where the treatment was exclusively planned and given at the joint clinic, the five-year survival-rate is 69%. If all cases where death took place from intercurrent disease are excluded, the rate is 77% compared with 67% from Wertheim's hysterectomy. It therefore seems that radiotherapy is not only undoubtedly the correct treatment in inoperable cases but also usually the preferable treatment for operable cases."

The case for radiotherapy is thus boosted by the following manœuvres or adjustments:

(1) Removal of intercurrent deaths.
(2) Removal of one lost case.
(3) Removal of 13 patients where the treatment was not *completely* in the hands of the joint clinic.

This judicious plucking of the statistical turkey leaves a rather scrawny bird! 23 patients survived with stage-I carcinoma out of an adjusted total of 30 to produce the 77% survival quoted in support of radiotherapy. One final statistical objection may be raised; the difference between the 77% survival following radiotherapy and 67% following surgery is less than one standard error and is therefore not significant.

As we read their report, therefore, we consider that the authors from their experience have formed certain opinions on radiotherapy and surgery, but we consider also that these opinions cannot be substantiated from their figures; for instance if they accept the simple manœuvre of sharing out the deaths from intercurrent disease between the radiotherapy and surgical group the five-year-survival figure is 67% for radiotherapy and 66% for surgery—i.e., there is little to choose between either method. At the moment, therefore, the surgeons and the radiotherapists are both necessary for

1. Blaikley, J. B., Lederman, M., Simmons, C. A. *Lancet*, 1957, ii, 1329.
2. Meigs, J. V. *Amer. J. Obstet. Gynec.* 1951, **62**, 854.

the care of the patient with cancer of the cervix, but it is still a matter of opinion which technique should be applied to the individual case with stage-I or stage-II cancer.

H. C. McLAREN
P. B. KUNKLER
A. L. T. EASTON
United Birmingham Hospitals. J. A. WATERHOUSE.

SIR,—The conclusion reached by Mr. Blaikley and his colleagues that radiotherapy is usually preferable to operative treatment in stage-I cases is not sound. They compared the death-rate, excluding intercurrent disease, of radiotherapy and Wertheim's hysterectomy in stage-I cases to prove this point. At the start of their article, however, they state that the main indications for surgery are (1) recurrence after radiotherapy and (2) inability to use radiotherapy in the presence of pelvic sepsis, pelvic tumours, or anatomical abnormalities. Surely any comparison between radiotherapy and Wertheim's hysterectomy is pointless in view of this selection.

Queen Mary's Hospital, Sidcup. CARL WOOD.

PROGNOSIS OF URINARY INFECTIONS IN CHILDHOOD

SIR,—I was particularly interested in the paper in your issue of Dec. 28 by Dr. Macaulay and Dr. Sutton on pyuria in childhood, and I entirely agree about the importance of the condition.

I am completing a long-term study of infants and children who have been under my care for urinary infections over the past ten years, and my experience has convinced me that close and long supervision is essential. Inquiry by letter and even a thorough clinical examination is not entirely satisfactory after an interval of several years, and may give a false sense of security. The child may be in a remission and neither the general practitioner nor the parent may have recognised minor relapses if these have been suppressed by short courses of sulphonamides prescribed for "upper respiratory infections".

Once a child has had pyuria a specimen should be taken for microscopic examination before chemotherapy is given in any subsequent illness. It may be legitimate to avoid pyelographic studies in the female after a single, straightforward, acute attack provided effective follow-up can be assured, but the examination is essential in all other cases and a number will require additional genitourinary investigation. The pyelogram itself may be misleading in children who have duplex kidneys, because the unaffected portion of the kidney may show an apparently satisfactory picture while the abnormal calyces and pelvis may not show up in the film until the infection has been controlled for some months.

Few common pædiatric conditions are more time-consuming than pyuria if it is to be carefully investigated, treated, and followed. Fortunately the great majority will ultimately clear up provided any structural abnormalities are recognised and can be treated successfully by surgery, and provided long-continued chemotherapy is given when necessary to prevent relapse.

Oxford. VICTORIA SMALLPEICE.

"MUNCHAUSEN'S SYNDROME"

SIR,—It might interest your readers to know of a recent article [1] on this condition, in which a case is discussed in great detail, with references to the coining of the term by Richard Asher. I wonder whether your readers agree with the author when he says:

"Such patients constitute an economic threat and an extreme nuisance to the hospital they choose to visit, for their deception invariably results in numerous diagnostic and therapeutic procedures. Publicizing their histories in journals, thereby alerting the medical profession, seems the only effective way of coping with them. Appropriate disposition would be confinement in a mental hospital. Such patients have enough social and mental quirks to merit permanent custodial care, otherwise their exploitation of medical facilities will go on indefinitely."

I wonder whether psychiatric treatment is indicated rather than confinement in a mental hospital. When one considers that these patients might possibly be victims of medical mismanagement, that they suffer from undiagnosed, misdiagnosed, or incurable conditions, that unnecessary or unsuccessful operations have been done on them, and that their behaviour pattern represents a psychopathic accretion built on their reactions to recurrent frightening symptoms,[2] psychiatric treatment promises hope to these unfortunate persons.

Cologne, Germany. T. RAGHAVACHAR.

FORCEPS DELIVERY

SIR,—Dr. Crawford (Dec. 14) writes that in St. Mary's Hospital, Portsmouth, he "conducted satisfactorily with 150 mg. pethidine and 50 mg. chlorpromazine given intravenously . . . a number of forceps deliveries". We hope that no more significance will be attached to Dr. Crawford's observations than was, we hope, intended; but lest Dr. Crawford's report here and elsewhere [3] might lead readers to suppose that this technique had been critically evaluated or was being practised in this unit, we wish to make the following observations.

These patients will be included in a general review of the effects of anæsthetic agents on the fœtus now being analysed for publication. The series on which Dr. Crawford bases his observations numbered eight patients. The forceps delivery was conducted on two of these occasions by the senior obstetric registrar, Dr. J. G. O'Sullivan, and in five by an obstetric house-surgeon.

In this series there were seven forceps deliveries, in six of which the anæsthetic was supplemented either by inhalations of cyclopropane or nitrous oxide, or by local infiltration of the perineum. Furthermore, in this series the induction-delivery interval necessary, and the incidence of delay in the breathing and crying time, all compared very unfavourably with the results following the administration of every other type of anæsthetic technique in use (thiopentone/nitrous oxide; thiopentone/relaxant/nitrous oxide; nitrous oxide/oxygen/ether; cyclopropane/oxygen; cyclopropane/oxygen/relaxant).

This series of eight patients was conducted during the period January–April 1957. Dr. Crawford's recollection is now that "this series was prematurely concluded, owing firstly to intervening vacations, and secondly to my leaving . . ." We now wonder why he did not use the technique on any of the numerous occasions available to him during the whole of the last five months of his appointment.

Until the value of such new techniques has been properly assessed by a controlled series, anæsthetists may be well advised to employ more proven methods. Finally, we should like to stress once more that although in the extremely small number of cases conducted by Dr. Crawford no statistically significant evidence could be obtained, the technique found little favour locally, and at the present time is neither advocated nor practised by anyone responsible for either the obstetric or the anæsthetic services in this unit.

R. J. HAMER HODGES
JOHN J. FOLEY
Obstetric Department, St. Mary's Hospital, Portsmouth. JOHN R. BENNETT.

1. Chapman, J. S. *J. Amer. med. Ass.* 1957, **165**, 927.
2. Small, A. *Brit. med. J.* 1955, ii, 1207.
3. Crawford, J. S. *Brit. med. Bull.* (in the press).

TICK-BORNE MENINGOENCEPHALOMYELITIS IN SWEDEN

SIR,—During recent years cases or epidemics of meningoencephalomyelitis caused by agents related to the Russian spring–summer/louping-ill group of tick-borne viruses have been reported not only from Russia but also from Czechoslovakia,[1] Hungary,[1] Slovenia,[2] Austria,[2] Poland,[3] Sweden,[4] and Finland.[5]

The first verified Swedish cases were in the summer of 1954. When, in 1956, again a large proportion of the cases of aseptic meningoencephalitis in Stockholm were found to have been tick-bitten, an enlarged study was undertaken. This time tissue-culture methods were adopted for the assay of neutralising antibodies and for the production of complement-fixing antigen. The results so far obtained seem to be of some general interest.

At first we tried the virus-cell system introduced by Oker-Blom [6]—i.e., a strain of louping-ill virus adapted by him to give cytopathic changes in cultures of HeLa cells. In our laboratory, however, this virus strain caused only late and partial changes, which varied too much to be used for quantitative tests. The cytopathic effect was not much better on KB cells. Detroit-6 cells[7] were, however, found to be considerably more sensitive; the changes appeared earlier, were more extensive, and were reproducible. The response of the cultures was the same following 12 passages of the virus. Actually, a suspension of a mouse brain infected with a strain of louping-ill virus (kindly supplied by Dr. F. O. MacCallum) that had never been carried in tissue-culture gave as clear-cut cytopathic changes. Moreover, the titre was the same ($10^{-7 \cdot 5}$ per ml. of the 10% suspension) in Detroit-6 cultures, and following intracerebral inoculation into three-week-old Swiss mice.

The stationary-tube cultures of Detroit-6 cells used for all neutralisation tests were grown out on a medium of Parker 199 with 40% human serum and maintained on bovine amniotic fluid fortified with 10% horse serum and 0·5% bactotryptose. Serial dilutions of serum were tested against a constant dose (1000 TCD_{50}) of virus, the mixtures being incubated at 37°C for one hour before inoculation. This dose of virus caused obvious microscopic changes within three days; the final reading of the neutralisation tests was made six or seven days after inoculation. A complement-fixing antigen that could be used without further treatment was prepared in Roux flask cultures. Guineapig serum was, however, substituted for the horse serum in this instance as the antigen otherwise became anticomplementary.

Neutralisation and complement-fixation tests were performed on the sera from 159 patients with the clinical diagnoses of aseptic meningitis, meningoencephalitis, or poliomyelitis, who were treated at the Hospital for Infectious Diseases in Stockholm during the latter half of 1956. Neutralising antibodies were found in the convalescent sera of 66 patients, and complement-fixing antibodies in 65 of these. Moreover, significant rises in titre (at least 4-fold) were found in the convalescent sera of 26 patients, most often with the complement-fixation test. On the other hand, none of 44 healthy blood-donors in Stockholm had neutralising antibodies against louping-ill virus. About 70% of the patients with antibodies reported that they had, within a couple of weeks before their disease, been bitten by ticks when on vacation somewhere in the Stockholm region during June-September. The corresponding figure for patients without antibodies was only 6%. The tick *Ixodes ricinus*, a known vector of this virus, is common in Sweden. The probability that a tick-borne virus, related to the Russian spring-summer/louping-ill group, caused the disease in the majority of patients with such antibodies is strengthened by the fact that no indications of other virus infections were found in this group. Thus no agents cytopathic for human embryonic lung cultures were recovered from stool specimens, and, furthermore, the complement-fixation reaction with heated poliovirus antigens (which responds quite broadly also to infections with several other enteric viruses, such as E.C.H.O.6 [8] and E.C.H.O.9), was consistently negative or gave only minimal titres. On the contrary, the 93 patients lacking antibodies against louping-ill virus included 25 excretors of enteric viruses (11 polioviruses and 14 other cytopathic agents) and 7 cases of mumps; high and often rising complement-fixation titres against heated poliovirus antigens were also common in this group.

The following clinical data have been computed from all 66 patients having antibodies against louping-ill virus. The clinical picture corresponded well with[4] that described in Central European tick-borne encephalitis.

Thus 75% had a diphasic course. The incubation-period—i.e., the interval between a single known tick bite (28 cases) and the first onset of disease—varied between two and fourteen days (mean six days). The prodromal stage lasted for two to twelve days (mean six days). It was characterised by moderate fever, headache, and muscle pains. After a free interval of two to twenty-five days (mean eight days) the major disease followed. Dominant symptoms were now high fever (lasting for five to twenty-two days; mean eleven days), splitting headache, neck rigidity, and vomiting. About half the patients had at least some clinical sign of encephalitis, such as disturbance of sleep, mental confusion, somnolence, vertigo and/or ataxia. Not less than 44 of the 66 patients had, however, a definitely pathological electroencephalogram during the first week and lasting for one to four weeks. 17 patients had transient paralysis (5 shoulder and/or upper arm, 1 shoulder and leg, 2 leg, 3 eye, 2 facial, 1 pharyngeal, 3 intestine or bladder). Lumbar puncture on admission revealed a moderate pleocytosis with mostly lymphocytes and a relatively high protein-content.

1 of the 66 patients died three weeks after onset of the meningoencephalitis. The convalescence of the others lasted between two and fourteen months (in 75% four months or less). The main complaints were the common ones after an encephalitis—i.e., headache following mental or physical stress, disturbance of sleep, and inability to concentrate and to memorise.

Virus Department of the Central Bacteriological Laboratory of Stockholm City.
GEROLF VON ZEIPEL
ARNE SVEDMYR.

Hospital for Infectious Diseases, Stockholm.
BÖRJE HOLMGREN
JONAS LINDAHL.

1. Sinkovics, J. Die Grundlagen der Virusforschung. Budapest, 1956.
2. Grinschgl, G. *Bull. Wld Hlth Org.* 1955, **12**, 535.
3. Przesmycki, F., Taytsch, Z., Wroblewska, Z, Semkow, R., Stanczyk, R. Kamieniecka, Z., Kirkowska, I., Kicinska, H. *Ann. Inst. Pasteur*, 1956, **91**, suppl. 1.
4. Svedmyr, A., Melén, B., Kjellén, L. *Acta med. scand.* 1956, suppl. 316, 20.
5. Oker-Blom, N. *Ann. Med. exp. Fenn.* 1956, **34**, 309.
6. Oker-Blom, N. *ibid.* p. 199.
7. Stulberg, C. S., Berman, L., Ruddle, F. H. *Proc. Soc. exp. Biol., N.Y.* 1955, **89**, 438.
8. Von Zeipel, G., Svedmyr, A. *Arch. ges. Virusforsch.* 1957, **7**, 355.

THE NEW CHINA

SIR,—May I correct two statements in Dr. Fox's account of the New China (Nov. 9)?

On p. 938 he says that "in the various medical colleges of the 1930s and earlier, teaching was usually in English but sometimes in other foreign languages, and the profession was disunited thereby." This implies that all medical colleges taught in a foreign language, which was usually English. Actually, although some of the better-known colleges, such as the Peking Union Medical College, did all teaching in English, a considerable number taught in Chinese. The West China Union University, with which I was associated, and Cheeloo University, both did almost all their teaching in Chinese. These were two of the more important Christian medical colleges in China. It is true that some English was used—e.g., for hospital histories—but lectures were almost entirely in Chinese. The fact that China today has a medical terminology is due very largely to the efforts of missionaries, and Causland's *Medical Lexicon* is still being reprinted in China.

Also on p. 938 is the statement: "I am told that after graduating in arts, qualification as a doctor took eight years and qualification as a nurse took five (which meant that too few nurses stayed the course)." Both statements are quite untrue, as a reference to the calendar of the Peking Union Medical College will show. The entire course (premedical, medical, and one year of internship) took eight years. Three years premedical, taken in any suitable university but usually in Yenching University, then four years of medicine (as in the U.S.A.), followed by one year of rotating internship was the total requirement for medical qualification in the P.U.M.C. At the

end of the first year of medical studies, Yenching University usually conferred a B.SC. degree—that is after three years in Yenching and one year in the P.U.M.C. The total requirement of West China and of Cheeloo was seven years, and of almost all other medical colleges in China it was six. As for the nurses, the P.U.M.C. certainly did not require an arts degree before entry. The total length of their nursing course—a degree course—was five years. In nearly all other schools of nursing the course was three years in length, and no degree was given. The P.U.M.C. nursing course was specially designed to train a relatively small number of future principals of schools of nursing, nursing superintendents (matrons) of hospitals, &c.

Department of Physiology,
University of Hong Kong. LESLIE G. KILBORN.

THE REINFORCEMENT OF TENDON-REFLEXES

SIR,—Dr. Penman (Jan. 4) raises the interesting question of the effective stimulus for reinforcement. We do not think that the "alerting" if unaccompanied by the effort of muscular activity is sufficient. For example, in fig. 3a of our paper the subject had been warned to be ready to grasp as soon as he felt the hammer blow. That he was fully alert is shown by his short reaction time, yet there was no reinforcement. On the other hand, we have noticed that some subjects tense their muscles as soon as they are alerted and we suspect that the effort involved in this movement accounts for the anticipatory reinforcement described by Dr. Penman. We agree that movement is not necessary, for we have observed reinforcement of the ankle-jerk produced by an effort to grasp when the forearm muscles were so paralysed by decamethonium that no detectable movement resulted. We feel that the effort to move, whether accompanied by a movement or not, is the effective stimulus for reinforcement, and this is what we intended to imply in our paper.

St. Thomas's Hospital,
London, S.E.1. A. J. BULLER
A. C. DORNHORST.

TRICHOMONAS VAGINITIS

SIR,—Dr. Marjorie Murrell (Dec. 21) criticises our article on the action of 'Locan' pessaries in trichomonal vaginitis. The following are her main points and our replies to them :

1. That our dosage of 'Penotrane' was not that now recommended by the manufacturers. The dosage used was the routine for the particular clinic and gave satisfactory results when the organism was sensitive. The failure-rate was due to genuine resistance in the strains and agrees exactly with that found in other, earlier, trials and in general experience.

2. That the exclusion of known promiscuous patients from the experimental series invalidates the comparison with the controls. It was not possible retrospectively to discover whether the controls were promiscuous or not. In any case the number of persons excluded from the trial was only five.

3. That there is in her experience a higher rate of sensitisation than we report. Her cases were treated elsewhere and when she saw them there was vulval eczema in 3 out of 12. The absence of eczema before treatment has not been established.

In our cases, and apparently in Dr. H. C. Perry's series (Dec. 21), there was no evidence of sensitisation. The case we mention complained of irritation but there was no inflammation or excoriation. Sensitisation will occur in some patients but the frequency should be low. The manufacturers of locan tell us that the same chemicals in other topical preparations are giving this in only 2 out of 15,000 cases treated.

The remaining criticism of our paper is directed to the nature of the trial. It appears to be widely believed that a mathematical estimate cannot be obtained unless alternate or randomly selected cases are treated and the remainder given blanks. This is not true if, as in trichomonas infestation, there is little chance of spontaneous cure during the period of observation and if the cure-rate for the population at large under alternative treatment has been established over many years.

The purpose of using a group of controls was to establish that the clinic population was not self-selected and notably atypical. Since the figures for both preparations used agreed with earlier trials and with the accepted figures for failures in treatment, such a comparison was fair. Using the familiar χ^2 technique, either with the series as published or with the addition of those cases still under treatment or in which the follow-up had been less than three months (giving 18 more cases with 3 relapses in previously relapsing patients, these now being taken as failures), the probability that the favourable results are due to a sampling error is less than 0·001.

St. Mary's Hospital Medical School,
London, W.2. H. C. STEWART.

EFFECT OF *d*-TUBOCURARINE CHLORIDE ON BLOOD-PRESSURE OF ANÆSTHETISED PATIENTS

SIR,—As Dr. Langton Hewer says in his interesting letter of Oct. 26, there have been a number of reports of a rise of blood-pressure following the injection of *d*-tubocurarine chloride. As far as I am aware, however, it has not been conclusively shown that such a rise can be attributed to the effects of this drug.

The rises in my cases were mostly small—only three being greater than 10 mm. Hg—and were not statistically significant. The blood-pressure of the anæsthetised patient is not constant but varies in either direction for a variety of reasons, some of which are ill understood. It was to this variability that I attributed the small rises in blood-pressure which I observed. There is nothing in my results, therefore, to support the contention that *d*-tubocurarine chloride may raise the blood-pressure of some patients.

I do not think that Dr. Burchell's interesting remarks (Nov. 9) are applicable to my results because control of respiration had been established in most of my patients at least 5 minutes, usually more, before the injection of *d*-tubocurarine chloride.

University Hospital,
University of Saskatchewan,
Saskatoon, Canada. EDWARD T. THOMAS.

VALIDITY OF THE UREA METHOD FOR ESTIMATING TOTAL BODY-WATER IN MALNUTRITION

SIR,—Dr. Srikantia and Dr. Gopalan (Nov. 23) recommend the use of urea for measuring total body-water. There are a number of points to be remembered.

A given dose of urea may not be completely absorbed; this may make calculations of total body-water inaccurate. After administration of doses of the order of 100 g. urea a day for the treatment of peptic ulcer, the blood-urea did not always increase as expected. There were increased levels of urinary urea, but not to a sufficient degree; one could only assume an incomplete absorption of these relatively large doses. My unpublished studies seem to confirm this view, but since unabsorbed urea may appear as fæcal ammonia rather than as urea, exact deduction is difficult.

If urea is fully absorbed it must not be assumed that it will diffuse into all the body-water. We have shown [1] that urea permeates slowly into the central nervous system.

1. Conway, E. J., FitzGerald, O. *J. Physiol.* 1942, **101**, 86.

Furthermore, some parts of the central nervous system may be impermeable to urea.

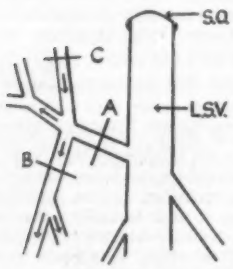
Finally, it should be remembered that urea is not biologically inert. Indeed, this is explicit in Dr. Widdowson's suggestion, and the purpose of the paper by Dr. Srikantia and Dr. Gopalan was to assess its importance. Urea may be broken down by gastric urease and by bacterial urease. We have found that the amount of gastric ammonia after urea administration (orally or intravenously) might be quite great.[2] This would affect the value of the urea as a test substance for total body-water. These considerations (apart from the reference to the central nervous system) possibly apply only under somewhat unusual circumstances, such as where large amounts of urea are being used or where incipient renal failure is present. They are, however, worth remembering.

St. Vincent's Hospital, Dublin, and University College, Dublin. OLIVER FITZGERALD.

THE STRIPPING OF VARICOSE VEINS

SIR,—Some of us have been performing this operation long enough now to come across an occasional recurrence. When this is at the site of high resection or "top-tie", and the notes show that every single branch joining at that point has been resected, we have to ask ourselves why the bypass has occurred.

I think the enclosed diagram may help to give us the answer: in other words, resecting the joining branch *close* to the main trunk of the long (internal) saphenous vein may still allow a bypass through the distal branches. To make quite sure that this state of affairs should not arise, it is necessary to resect and ligate at the points diagrammatically represented at C and B in the accompanying figure.



Ligation of branches of long saphenous vein. A: site of usual ligation. B, C: additional ligatures needed to prevent bypass. L.S.V.: long saphenous vein. S.O.: saphenous opening.

The most common cause of "recurrence" that comes my way I find to be failure to strip the short (external) saphenous vein when dealing with the eradication of the internal saphenous vein. In a high percentage of cases this extra procedure I find to be necessary at the original operation.

There are many other causes of recurrence, but I do feel that these two are of sufficient importance for our special attention.

London, W.1. R. ROWDEN FOOTE.

A THYROID ASSOCIATION

SIR,—The Fourth International Goiter Conference is to be held in Britain in 1960 and the American Goiter Association, which usually holds its annual meeting in one of the cities of the U.S.A., is on this occasion holding its annual meeting in London in conjunction with the International Conference. The London arrangements for these meetings are being made by a committee of the London "Thyroid Club".

These developments have raised the question of whether there should be formed a "Thyroid Association of Great Britain" or "of Europe", which should probably be linked in some way to the Society for Endocrinology and the section of endocrinology in the Royal Society of Medicine. If those who feel that some such association should be formed would notify the undersigned, the amount of support for this idea could be ascertained. If it then seems desirable a preliminary meeting will be arranged, possibly in association with the national joint meeting of the Society for Endocrinology and the section of endocrinology in the Royal Society of Medicine.

Postgraduate Medical School, London, W.12. RUSSELL FRASER
SELWYN TAYLOR.
University Department of Medicine, Gardiner Institute, Western Infirmary, Glasgow. E. J. WAYNE.

INTELLIGENCE OF DRIVERS

SIR,—Although I have not experienced the hazard described by Dr. Millman (Jan. 4) I have often thought that the sign "dual carriageway" itself offers a potential danger. Neither "dual" nor "carriageway" is a word commonly used in speech and it is doubtful if the meaning of "dual" would be readily comprehended by the semi-literate. The expression "dual carriageway" is liable also to be misinterpreted, for ordinary roads can be regarded as dual carriageways in the sense of providing two ways or directions of movement for vehicles. Perhaps this is why the expression is not to be found in the Highway Code.

Teddington, Middlesex. A. G. J. EVANS.

AID FOR VOLUMETRIC FILLING OF SYRINGES

SIR,—Preparation of an accurately measured volume of fluid in a syringe is often associated with spilling and dribbling of the excess fluid as an attempt is made to get rid of air-bubbles. This is especially troublesome when one is handling frothy fluid, such as blood, or radioactive material, where it is essential to avoid contamination.

The problem can be solved by the simple means of using a U-shaped needle, shown in the accompanying figure. This is prepared by bending an 18-gauge standard hypodermic needle, $2^1/_2$ in. long, into the suitable shape; with careful manipulation the standard steel needle will take this strain without snapping, especially if first heated.

The solution is drawn into the syringe beyond the graduation mark in the usual way; the U-needle is then fitted to the nozzle of the syringe which is held inverted. When the piston of the syringe is pushed, all air bubbles are ejected, and excess fluid is returned to the stock bottle held in position below the needle-point. During this manipulation sterile conditions can be maintained with ease.

Department of Hæmatology, Postgraduate Medical School of London, London, W.12. S. M. LEWIS.

ENZYME TESTS FOR GLUCOSE

SIR,—From time to time adverse reports have been published on the enzymatic testing of urine for glucose. Recently Tunbridge [1] suggested an error of 11% when urine is tested in this manner. On the other hand, the advantages of this method are such that it should not be rejected lightly unless there is clear evidence that it is unreliable.

In my diabetic clinic at the Beverley Westwood Hospital, each patient brings with him four specimens of urine which have been passed at specified times on the previous day. My present series covers 932 samples of urine each of which was tested by the 'Clinistix' method and also by the standard

2. FitzGerald, O., Murphy, P. *Irish J. med. Sci.* 1950, March, p. 97.

1. *Prescribers Notes*, 1957.

Benedict technique in a water-bath. The urine is tested by a laboratory technician. Of those 932 samples 12 gave a false positive reaction. On the other hand, not one gave a false negative. False positives are of little importance, as under normal routine all urines which give a positive reaction to 'Clinistix' must have this confirmed by water-bath test. I strongly suspect that, in the case of at least some of the false positives, they were read off later than thirty seconds. Those results would suggest that it is a reliable test for glucose in urine.

Beverley. R. D. MILLER.

INFANTILE GASTROENTERITIS

SIR,—I should like to support Professor Watkins' condemnation (Dec. 21) of the indiscriminate use of antibiotics in infantile digestive disorders. I use the latter term deliberately because I agree with Dr. Easton (Dec. 28) that most cases of so-called gastroenteritis seen nowadays are non-infective; rather do they result from dietetic mismanagement by the mother because of ignorance or indifferent professional advice.

Present-day reliance on bottle-feeding leads to trouble at both the major weaning periods: (1) when the mother first attempts to wean the infant from the breast on to the bottle, usually after leaving hospital; (2) when mixed feeding commences and choice of other natural foods becomes a problem. At both times the divided responsibility of her advisers (hospital, child-welfare clinic, health visitor, midwife, and family doctor) does not favour unanimity of professional opinion, though it is true that the necessary explanation and reassurance is time-consuming. The reason why babies do better in hospital is surely not the use of antibiotics, or a lessening of doubtful infectivity, but the skilled nursing (rather than medical) attention which is given to feeding, its timing, and above all the absence of panic and fussing.

Ilford Isolation Hospital, Romford, Essex. I. M. LIBRACH.

MANIPULATION FOR BACKACHE

SIR,—We must all applaud Mr. Bremner (Jan. 4) for drawing renewed attention to the useful part played by manipulation in the relief of backache. This fact calls for reiteration until its value is recognised at every hospital in the country. When this becomes so, patients requiring such treatment will no longer have their time wasted by futile physiotherapy nor be forced to go outside the N.H.S. to seek relief from lay manipulators.

While I can only admire Mr. Bremner's courage in manipulating under anæsthesia, this unfortunately militates against a good result. Comparison between his 10% complete relief after one session with the 57% reported by Barbor [1] and the 49% when anæsthesia is avoided,[2] shows clearly what a handicap anæsthesia is. The reason is this.

We are agreed that the aim is to restore a painless range of movement to the affected lumbar joint(s). But it often happens that forcing movement in one way does good whereas in another does harm. Which technique is most suited to any one case can be discovered only by questioning the patient about his pain and assessing his range of straight-leg raising and of lumbar movements after each manœuvre. Anæsthesia deprives the manipulator of this necessary guidance. Moreover, the manipulation should cease when a painless range has been restored. How can the manipulator know that this point has been reached unless the patient can stand up, move in each direction, and report the result? Good work carried out under adequate control demands a fresh assessment of the case after each separate manœuvre such as is rendered impossible by anæsthesia.[3]

1. Barbor, R. *Brit. med. J.* 1955, i, 412.
2. Cyriax, J. Congress of Occupational Health, Helsinki, 1957; vol. i, p. 122.
3. Cyriax, J. Orthopædic Medicine; vol. i, p. 454. London, 1957.

There is another disadvantage: the small number of patients that can be treated if admission for the night, use of the theatre, and the services of an anæsthetist are needed. Moreover, both hospital and patient are reluctant to repeat so elaborate a routine at whatever intervals prove necessary. This is important; for relapse within three years amounts to over 40%, and some patients need treatment once or twice a year.

We are careful to avoid physiotherapy after a successful manipulation, and regard it as useless when manipulation fails; hence our only after-treatment is postural instruction and perhaps a corset.

Our statistical assistant, Mrs. Granger-Taylor, has supplied us with the following figures for 370 patients, all seen in 1953 and followed-up for not less than three years.

Pain in Back (46%)

(1) Treated by manipulation, 58%
  Well in one session, 49% } 60%
  Well in two sessions, 11% }
  Recurred within three years, 44% of those relieved by manipulation
(2) Treated by traction, 13%
  Well in two weeks, 38%
  Recurred within three years, 20%
(3) Treated by epidural injection, 17%
  Well, 43%
  Recurred within three years, 21%

Sciatica (54%)

(1) Treated by manipulation, 31%
  Well in one session, 33·5% } 45%
  Well in two sessions, 11·5% }
  Recurred within three years, 40%
(2) Treated by traction, 25%
  Well in two weeks, 68%
  Recurred within three years, 20%
(3) Treated by epidural injection, 26%
  Well, 66%
  Recurred within three years, 18%

These are personal figures. At St. Thomas's Hospital, as is well known, nearly all manipulation is carried out by physiotherapists. It is thus probable that statistics based on their work would show results in rather more sessions, since many are still students. However, these students have manipulated with success in cases where manipulation under anæsthesia had failed; hence I feel sure that Mr. Bremner will be able to obtain results surpassing those in his present series, satisfactory though these already are, merely by avoiding anæsthesia.

London, W.1. JAMES CYRIAX.

SIR,—Mr. Bremner's article is, I think, the clearest and least biased article on the subject that I have read.

Being unprejudiced he inevitably arrives at the conclusion that manipulation is a good thing. All right; let the manipulation be carefully applied and the manœuvres thoroughly studied; then, Sir, he can probably dispense with the anæsthetic and possibly eliminate one of the "variables".

London, W.1. W. HARGRAVE-WILSON.

EFFECTS OF CERTAIN PROTEIN FOODS ON BLOOD-SUGAR LEVELS AND GLUCOSE TOLERANCE

SIR,—When we reported our results [1] (Aug. 17), we had also observed that two hyperglycæmic patients showed considerable improvement when their diet contained, in addition to their normal complement of rice or chappatis or bread, a greater proportion of fish, egg, or lean meat but little or no fatty food, such as bacon and pork. However, as no quantitative data on the calorie intake of these patients had been recorded, it was thought that these observations could wait until we had occasion to publish in detail the results of our further study, now in progress, on the effects of ingesting different types of proteins (of both animal and vegetable

1. *Lancet*, 1957, ii, 317.

origin) and their hydrolysates on blood-sugar and glucose-tolerance in healthy and hyperglycæmic subjects. But in view of the interesting letter by Dr. Bicknell [2] it seems appropriate to record our findings with animal-protein diets.

Divison of Biochemistry and Nutrition,
Central Food Technological Research Institute,
Mysore, India. M. SRINIVASAN.

OSTEITIS PUBIS AFTER INGUINAL HERNIORRHAPHY

SIR,—May I congratulate Mr. Le Vay and Mr. Borman on their report (Dec. 21). I would like to add to their cases a personal one that occurred in a series of over five hundred herniæ in men over 50 years of age.

The patient was a man of 50 and he evinced the same symptoms of backache and pubic and perineal pain. Before the diagnosis was made he was seen by a rheumatologist, a physician, a neurologist, and my friend Mr. E. W. Riches, who diagnosed the condition: he was called in because of a suspicious hardness of the prostate (? carcinoma).

Although in this patient there was no apparent infection, I think the underlying cause is a subclinical infection about the stitch (in this case no. 50 linen thread), which passes into the periosteum of the pubic tubercle, with a spreading reaction in the pubic vessels. He completely recovered in 18 months. His X-rays were identical with those shown by Le Vay and Borman. It is a baffling and tiresome complication.

London, W.1. HAROLD DODD.

SIR,—Mr. Le Vay and Mr. Borman [3] should be congratulated on immediately recognising the condition of osteitis pubis as their "second and third post-herniorrhaphy patients tottered into the orthopædic clinic".

Osteitis pubis was first described as a postoperative complication by Legueu and Rochet in 1923 [4] and fully dealt with by Edwin Beer [5 6] in 1924 and 1928. Many papers have appeared on osteitis pubis since, but not very much has been added to Beer's original postulate that most probably trauma and infection were the main factors responsible for the development of this complication.

I drew attention to this condition in 1947 [7] after I had diagnosed osteitis pubis in one of my patients, who was shown at the meeting of the Middlesex County Medical Society on June 9, 1945. Although not generally known then, the syndrome later did become well recognised in the British Isles, especially among urologists, as a complication following operations on the bladder and prostate. As I observed in 1947, typical instances of osteitis pubis had already been reported following operations for hernia and further observations would prove that this complication was not rare.

It was interesting to read again about the failure to influence the course of this condition by any active treatment including cortisone. I have had the opportunity of trying cortisone and found that it did relieve the pain (previously quite unaffected by large doses of morphine) and allowed the patient free movement, but the injections had to be discontinued on account of prohibitive side-effects.

In my own personal series of 300 suprapubic bladder operations, chiefly prostatectomies, on which I reported in 1947, osteitis pubis arose in 10 patients (3%). Looking back, I now believe that this was most probably due to a flaw in my technique, as all lower abdominal operations infringing the integrity of the pubic periosteum would appear to be liable to the complication of osteitis pubis.

London, W.1. E. KIRZ.

RADIATION: FURTHER WARNINGS

SIR,—The leading articles and annotations of *The Lancet* used to be, and should still be, like Cæsar's wife. It is true they are difficult to write. They review data published in the world's scientific and medical press and often give guidance to the reader in the form of critical editorial opinion. The journal and its editors cannot be blamed for drawing the "wrong" conclusion or holding "wrong" opinions, but they can be castigated for misreporting the data.

Recently I have been taken to task by my colleagues overseas for permitting to pass without comment a leading article in *The Lancet* referring to radiobiological work in which the data were wrongly reported. It was left to workers in the Netherlands to voice objection in a letter to *The Lancet*. Unhappily there is now a recurrence in the annotation of Dec. 28. I must beg leave to point out the error.

After summarising some recent publications, in fair but somewhat lurid form, the annotation works round to genetic damage produced by radiation; it then becomes misleading. To Glass [1] is attributed the statement: "Since mutations are caused by the fracture of a chromosome followed by reunion of the broken ends in a new pattern, at least two fractures are needed for a mutation; that is why the incidence of mutations increases as the square (or some higher power) of the dose". In fact Glass was very careful to discriminate between *chromosomal* mutations such as the above and *point* mutations. I quote from his article:

"Inasmuch as the chromosomal mutations are produced chiefly by high doses, and in those very cells that are most readily eliminated through the production of the well-known temporary sterilisation of the male after acute doses of radiation, there is relatively little genetic damage to be expected from them.

"Of chief importance, then, are the point mutations, in which the lesions of the hereditary material are submicroscopic in size . . .

"All existing genetic evidence indicates that the frequency of point mutations increases linearly with the radiation dosage."

Everything that I have quoted from Glass is standard teaching based on scientific data. It has all been said many times before and is to be found in the report of the Medical Research Council's committee [2] and in the report of the National Academy of Sciences.[3] It is true that Glass interprets the established data in a rather more pessimistic fashion than either of the national committees; like any thinking scientist, he is fully entitled to his personal opinion. It is not right, however, for you to take Glass' opinions and hang them on to distortion of the facts.

Radiobiological Research Unit,
Harwell, Berks. JOHN F. LOUTIT,
Director.

CHEST X-RAY EXAMINATIONS AND RADIATION HAZARDS

SIR,—Dr. Anderson, from his letter in your issue of Jan. 4, does not seem to realise that his camel has now shrunk as a result of the advent of long-term chemotherapy until it is small enough to pass through the eye of a needle.

The Chest Clinic,
Harrow, Middlesex. R. GRENVILLE-MATHERS.

2. *Lancet*, 1957, ii, 388.
3. Le Vay, D., Borman, J. B. *Lancet*, 1957, ii, 1252.
4. *J. Urol., med. chir.* 1923, **15**, 1.
5. Beer, E. *Int. J. Med.* 1924, May, vol. 37, fasc. 5.
6. Beer, E. *J. Urol.* 1928, **20**, 233.
7. Kirz, E. *Brit. J. Surg.* 1947, **34**, 272.

1. Glass, B. *Science*, 1957, **126**, 241.
2. The Hazards to Man of Nuclear and Allied Radiation. Cmd. 9780. H.M. Stationery Office, 1956.
3. National Academy of Sciences and National Research Council, The Biological Effects of Atomic Radiations. Washington, 1956.

Obituary

ERNEST LAURENCE KENNAWAY

Kt., M.A., D.M. Oxon., D.Sc. Lond., F.R.C.P., F.R.S.

Sir Ernest Kennaway, who died on Jan. 1 at the age of 76, had the great gift of scientific curiosity in such degree that neither disabling illness nor age could turn him from his purposes. The achievements of his able mind included the first demonstration, in 1930, that cancer can be produced by a pure chemical compound; and through many years he proved a leader in the new study of carcinogenesis.

Son of L. J. Kennaway of Exeter, he distinguished himself as student and graduate successively at University College, London, at New College, Oxford, at the Middlesex Hospital, and at Guy's Hospital, where for some years he demonstrated physiology. From the first he was interested chiefly in the biochemical side of medicine, and he did much work on purine metabolism and on acetonuria. From Guy's he moved back to The Middlesex as chemical pathologist, and thence to the Cancer Hospital. Already in the early 1920s he recognised that the cancer-producing properties of coal tar and allied materials implied the presence of specific chemical individuals having this property, and he undertook a series of painstaking researches, unaided except by a technician whom he trained, in which he examined tar fractions and a large number of the known constituents of tar.

From his first paper, published in 1924, an important conclusion was that the cancer-producing substance was present in a fraction of pitch distillate which came over above 500°C. This work was followed by studies of artificial cancer-producing tars formed by the pyrolysis of acetylene, isoprene, cholesterol, and other organic materials, and then of the very potent high-boiling fractions of the mixture of hydrocarbons formed by the action of aluminium chloride on tetrahydronaphthalene. Although Kennaway himself seemed not to appreciate the fact, this pioneer work showed fairly conclusively that the materials he sought were complex hydrocarbons, probably of aromatic type.

These efforts were presently supplemented by those of physicists, chemists, and a biochemist in the team which he assembled, and had their culmination in 1932 in the isolation from coal-tar pitch of a potent carcinogenic hydrocarbon which was shown by synthesis to be the hitherto unknown 3:4-benzpyrene. Kennaway's own general account of these researches was published in 1955. A parallel line of investigation, based on the fluorescence spectroscopic studies of Mayneord and Hieger, led to recognition of a considerable group of potent carcinogenic hydrocarbons, all of them prepared synthetically. The carcinogenic activity of the first of these, 1:2:5:5-dibenzanthracene, was described by Kennaway in 1930, although, through a chemical error which Dr. J. W. Cook was able to correct, the compound was wrongly described in his paper as 1:2:7:8-dibenzanthracene.

A detailed account of the biological properties of these hydrocarbons is given in a series of papers in the *Proceedings of the Royal Society* with the general title of the Production of Cancer by Pure Hydrocarbons. A brief summary of these and later developments by Dr. Cook appeared in our columns last February.

Perhaps equally important were Kennaway's epidemiological studies, carried out with Lady Kennaway, who also assisted in his experimental researches.

This very laborious work involved the examination of tens of thousands of death certificates and illustrates Kennaway's flair for amassing, classifying, and correlating data. Such studies have aimed at correlating the numbers of deaths from cancer, in various years, with sites of the disease and occupations, environments, and other circumstances of the victims. The Kennaways' 1936 publication, a Study of the Incidence of Cancer of the Lung and the Larynx, was one of the earliest papers to focus attention on the rising incidence of lung cancer, especially in men. It was followed by two others in the same field, in 1947 and 1951; and in the latter year Kennaway also published an illuminating survey, Cancer of the Lung in Relation to Tobacco, in which he followed up an earlier experimental study of the arsenic content of tobacco from various sources.

Of the man who achieved this big output of valuable work, some idea is given by the following extracts from tributes by his friends.

* * *

Sir Ernest Kennaway was one of the great men of his generation. He was essentially a shy man and in some respects unduly modest. He shunned publicity and was perhaps little known outside the immediate circle of his medical and scientific colleagues. Until his latter years he declined to take part in public discussion in any form, even at small intimate scientific gatherings. This was probably due in part to the handicap of the affliction from which he suffered for more than thirty years, but which he was able largely to overcome by dogged determination and sheer force of character. He was a man of high principles and would pursue any course in which he believed with the ardent zeal of a crusader. He would never take "no" for an answer, and compromise was no part of his make-up. None, however eminent or exalted, were spared the lash of his tongue or the pungency of his pen when he disapproved of their actions or their neglect to act. Himself very painstaking and methodical, he had no patience with careless or slipshod work in any form, and was quick to point out inaccuracies and to rebuke their authors. One of his last remarks to me, a month before his death, was: "Well, although I can no longer walk, I can still bite."

But the picture of a stern, forbidding personality would be unjust to his memory. Although Kennaway was not a man with whom people took liberties, he was nevertheless a friendly and hospitable man, and in the manifestation of these qualities he was greatly helped by the grace and charm of Lady Kennaway, to whose care and support he owed much. In his own way he had a keen sense of humour. He was particularly kind and generous to his younger colleagues, many of whom had good cause to be very grateful to him for his inspiring encouragement and for the stimulating enthusiasm with which he took an interest in their work. He displayed unbounded confidence in their ability to overcome their difficulties and great delight when they succeeded.

Sir Ernest was no narrow specialist. He had received a broad scientific training in addition to his medical training and was also a man of wide general culture. In his latter years he took some interest in religious beliefs and religious customs, but his views were rather bigoted and this was not one of his happiest pursuits. He had a graphic style and his published accounts of his travels—to Iceland, to Norway, and to the United States, for example—were full of factual information of great value and punctuated with entertaining asides and comments on details which would have escaped the notice of most people. At one time he was interested in the cinema, and his article, Zadigism and the Cinema, published in *St. Bartholomew's Hospital Journal* in 1949, is an amusing

commentary, which shows some of his breadth of knowledge, on the incongruities as regards both time and environment of some of the films he had seen.

For about forty years Kennaway had dedicated himself to cancer research, and no-one has made greater contributions to it than he. This has been generally acknowledged throughout the world. His work is characterised not only by the genius which comes of an infinite capacity for taking pains but also by an inspired faith in its methods and its outcome. That he was able to make the right approach was due in no small measure to his detailed knowledge of various fields of pathology, chemistry, and biochemistry. His general appreciation of several branches of science enabled him to guide and direct the efforts of a team of experts, each of whom was enabled to bring his own specialised knowledge and experience to bear on the problems under investigation.

Though it is probably too early to make a final assessment of the importance of this work, it has completely reorientated cancer research. Kennaway himself wrote of it in 1945 with characteristic understatement: "The very numerous carcinogenic compounds which have been discovered in the last 15 years have served, even if they have done nothing else, to dispel some of the rather hopeless mystery which used to surround the whole subject of the ætiology of cancer." It is to be hoped that a collection of his more important papers may yet be reprinted. They would serve as models for many young people embarking on a research career. J. W. C.

Others, who knew Sir Ernest earlier than I, will describe his pioneer work, which all respect and which many of us would do well to reread at intervals. I met him first during the last war, when on the eve of enlistment I came to ask him whether a bit of unfinished work was worth recording: he made me publish it. Later I found myself on the fringe of his wide zone of interest in tobacco carcinogenesis, and undertook some tests in this field. He had a remarkable way of showing his interest in one's work, which often seemed to give it an importance one had not thought it possessed. I feel an affectionate gratitude for the kindly and persistent efforts he made, despite illness, during recent years to stimulate and encourage and guide those whom he believed could help in the study of lung cancer. M. H. S.

During the last years of his life Sir Ernest suffered from at least four major conditions, any one of which would have been sufficient to induce most other men to cease active work. But though his body was infirm, his mind retained an extraordinary vigour. It was characteristic that during his last illness, when he knew that he was seriously ill, he wrote an article on nursing from the patient's point of view, and continued to plan for the future; only two days before his death he telephoned a friend to inquire about the chemical peculiarities of the fuel used to smoke fish in Iceland, which process he thought might contribute to the high incidence of cancer of the stomach there.

In later years his interest centred particularly on the epidemiological approach to the study of cancer, and he published papers on the epidemiology of cancer of the larynx, lung, penis, and cervix uteri. But he was never content merely to discover differences in incidence; his object was always to find out what lay behind them and how they were produced. No aspect of human behaviour was too trivial for his attention, and he allowed no taboos to stand in his way. Any subject was fit for speculation, but he distinguished himself from so many others by immediately setting out to obtain quantitative data which would allow his speculations to be tested.

He was not an easy man to get on with and took offence at times, where none was intended. This, however, nearly always arose because of his inability to appreciate how much he was honoured. He was in reality a humble man and always assumed that his contributions and opinions were unwanted and would be ignored. He was at his best in contact with young workers, whom he treated as his equals, and he was as ready to learn from them as they were from him. To those who worked along with him he showed a lively sense of humour and a warm humanity; to them he was a source of constant inspiration and a model of the devoted inquirer after truth.

R. D.

HAROLD GEORGE BEDFORD RUSSELL

M.A., B.Chir. Cantab., F.R.C.S.

Mr. H. G. Bedford Russell, consulting surgeon to the ear, nose, and throat department of St. Bartholomew's Hospital, London, died on Dec. 30 at his home in Oxfordshire.

He was born at Geelong, Victoria, in 1886 and went to school in Australia. He came to this country to study medicine at Sidney Sussex College, Cambridge, and at St. Bartholomew's Hospital, qualifying in 1911. During the 1914–18 war he served in France with the rank of major, and acted as D.A.D.M.S. of IX Corps. For his work he was mentioned in despatches and awarded the Croix de Guerre.

In 1919, after he was demobilised, he took the F.R.C.S. and was appointed chief assistant to the ear department at Barts under Ernest West and Sydney Scott. After West's retirement the departments were regrouped and Bedford Russell moved to the throat department, then a separate unit under Mr. Douglas Harmer and Frank Rose. Bedford Russell was closely associated with Mr. Harmer in his assessment of the value of radiotherapy in cancer of the upper air-passages (later published as the Semon lecture of 1931). Much of the analysis of results and data was entrusted to Russell.

Russell also joined the staff of the Hospital for Diseases of the Throat in Golden Square, at first as registrar, later becoming assistant surgeon, surgeon, and dean. He worked for some years at the Facial Injuries Hospital at Sidcup at the time when Sir Harold Gillies and Prof. Pomfret Kilner were laying the foundations of modern plastic surgery. In 1928 he was appointed assistant surgeon to the throat department at Barts, and two years later he succeeded Frank Rose as head of the department.

Bedford Russell worked extremely hard at his hospitals, quickly built up a large private practice, and yet was an active member of a number of medical societies. From 1932 to 1934 he was secretary of the section of laryngology of the Royal Society of Medicine, and he arranged for Ferris Smith to visit this country and demonstrate to his colleagues here his external operation for chronic ethmoiditis.

Of Bedford Russell's work as a surgeon and his interests as a man F.C.O. writes:

Bedford Russell was enterprising and energetic in everything he did. In his professional life his early efforts were concentrated on the throat, but later his attention became diverted to the paranasal sinuses. He took up the study of infection of the sinuses with customary zeal and developed the operative technique to the most complete drainage and exenteration possible. He became interested in the effect of sinus infection on the mind and gave many years to the study and investigation of the relation between sinus disease and mental disorders. He was associated with a number of institutions and societies concerned with mental diseases and wrote many papers on the subject.

He was a keen tennis-player, putting his characteristic dynamic energy into the game and deriving equally characteristic enjoyment from it. He took up skiing with the same enthusiasm, visited Mürren every year, and gave the Bedford Russell cup for which an annual competition is held. He derived the greatest exhilaration from the weeks he spent each year in Switzerland. He took to country life, with its attendant sports and responsibilities, with the usual energy and drive and rented and farmed a number of estates in various parts of the

Home Counties. The part of squire was one that afforded him great satisfaction.

Mr. Bedford Russell married in 1928 Lilian, daughter of the late Harold Longmore-Mavius. She survives him with their two sons.

HAROLD PERCY WALLER BARROW

C.B., C.M.G., D.S.O., O.B.E., M.R.C.S., D.P.H., D.T.M.

Major-General Barrow, who died on Dec. 20 at the age of 81, was director of hygiene at the War Office from 1924 till 1930 and colonel commandant of the Royal Army Medical Corps from 1941 to 1946.

He was born at Madras, the son of Colonel H. J. Waller Barrow, A.M.S. After qualifying from Guy's Hospital in 1898 he became a surgeon probationer, and he received his commission in the R.A.M.C. the following year. He served in South Africa from 1900 to 1902 and later he was posted to the Punjab and to Jamaica. In the first world war, after a time as deputy assistant director-general at the War Office, he served in France as A.D.M.S. of a division and was awarded the D.S.O. in 1918. After the war he returned to India as deputy director of hygiene and pathology at Army Headquarters, and in 1924 he took up his last Army appointment as director of hygiene at the War Office.

After he retired in 1930 he became health officer in Antigua and a member of the Federal Executive Council of the Leeward Islands and Antigua until 1933. Later he settled at Epsom where his many activities included work as a commissioner of the Royal Hospital, Chelsea, and as a member of the committee of the Royal Patriotic Fund Corporation. Some years ago he moved to Brockenhurst, and he died at his home there. In 1901 he had married Miss Estella Hertog of The Hague, by whom he had two sons and a daughter.

A colleague writes that many who as young officers served under Boy Barrow will remember "his kindly interest and the hospitality which he and his wife dispensed so generously and so enjoyably."

WILLIAM JAMES FENTON

M.D. Cantab., F.R.C.P.

Dr. Fenton, consulting physician to the Brompton Hospital and Charing Cross Hospital, died in London on Dec. 24 at the age of 88.

He was educated at Leamington Collegiate School, Caius College, Cambridge, and St. George's Hospital. After qualifying in 1894 he held several resident appointments at St. George's, and he seemed set for a place on its staff. But he was unlucky; for, when he reached the age when promotion could be expected, no vacancy seemed likely for some time. Fenton accordingly applied for and obtained an appointment at Charing Cross Hospital as an assistant physician. Shortly afterwards a death vacancy occurred at St. George's, but Fenton felt that as he had thrown in his lot with Charing Cross he could not seek election to St. George's, though it was a great disappointment. Soon afterwards he was elected to the staff of the Brompton Hospital, and he became a fellow of the Royal College of Physicians in 1907.

The National Health Insurance Act of 1911 called for the setting up of a tuberculosis dispensary for Chelsea; and when it was decided that this should be located at Brompton, Fenton became medical officer in charge. For some years he was dean of Charing Cross Hospital Medical School, and later he became dean of the Brompton Hospital School. He retired from the staff at Charing Cross in 1933, but remained till 1939 at Brompton, where a member of the staff at that time need not retire until he had been a full physician for twenty years.

Fenton was one of those who was a consultant in diseases of the chest before chest X-rays had shown their worth; but he was quick to appreciate their value as soon as technical advances produced satisfactory plates, and in *Diseases of the Chest* (1930) with his co-author, the late L. S. T. Burrell, he suggested that the importance of clinical signs could be exaggerated in view of the precision of modern methods of diagnosis. Of Fenton as a colleague and a friend, F. H. Y. writes :

He was a capable and careful physician, though his was not an original mind. His work at his hospitals was of a high standard, and he was popular with his patients because of his interest in their welfare. His chief hobby was photography, and after his retirement he presented to the Brompton Hospital Medical School two volumes of beautifully reproduced photographs of X-rays of obscure diseases of the chest. Architectural photography was another of his interests when on holiday. In the early part of the war most of his time was spent taking photographs for the National Building Records. He was keenly interested in music, and as a young man was a competent performer on the violin. Fenton was not easy to get to know, and few of his colleagues knew him except through his hospital work. Those who did know him, however, found a kindly and perceptive man.

Dr. Fenton's wife died in 1930, and one of his sons was killed on active service during the late war. He is survived by a daughter and a second son.

EDITH MAY HALL

M.D. Lond., F.R.C.S., F.R.C.O.G.

Miss Edith Hall, gynæcologist and obstetrician to the South London Hospital for Women, died at her home in Hampstead on Dec. 26 at the age of 61.

She graduated M.B. from the London School of Medicine for Women in 1920, and on taking the M.D. in 1922 won the university gold medal in midwifery and gynæcology. In 1923 she was appointed an assistant in the obstetrical and gynæcological unit at the Royal Free Hospital.

She also joined the staffs of the Marie Curie Hospital when it was first opened in 1925, and of the London Homœopathic Hospital. In 1935 she became assistant surgeon, and later full surgeon, to the South London Hospital for Women. For many years she also held the post of consultant gynæcologist and obstetrician to the London County Council hospitals service.

Since 1949 ill health had gradually forced her to give up much of her hospital work, but she remained on the staffs of the London Homœopathic Hospital and the Marie Curie Hospital until her death. How much she still found time for is shown by the following tribute from O. R.

Edith Hall's success was due to natural ability, combined with a phenomenal capacity for sheer hard work, and a retentive memory. She also developed at an early age the maturity of mind and character and the sense of responsibility which made her such a valuable member of her profession. She never had a great fund of physical energy, although she was able to stand for long hours in the operating-theatre. Her hospital appointments entailed many regular sessions and a considerable amount of emergency work; she had long distances to cover by car, and always drove herself, and any time left over must have been fully occupied with committees and with her private practice. Despite all these demands she never allowed herself to be hurried over her professional work; she was in fact a slow worker, spending a considerable time in talking to her patients and allowing them to talk to her, thus making an effort to get to the bottom of their difficulties and troubles. She had an exceptionally equable temperament, and always appeared calm and unruffled. Completely unassuming, her innate charm and courtesy of manner never failed and was always sincere. She had a sense of humour, and an infectious rather conspiratorial chuckle, even when the joke was against herself; her standards were high, and she never deviated from

what she considered right. Her judgment of people could be penetrating and acute, though she looked on the failings of others with a slightly humorous and kindly tolerance, and she never spoke unkindly about anyone.

Though she had considerable strength of character and held decided opinions, she was always conciliatory, and on those occasions when she felt very strongly about anything, especially where the running of the hospital or the welfare of the patients was concerned, she could be tenacious to the point of obstinacy; nevertheless she always listened with courtesy to the views of others, and often managed to get what she wanted by tactful persuasion.

In spite of her busy life, she always found time to keep in touch with her old house-surgeons and registrars, and she took a great interest in their careers. Many of them are now settled abroad, and they always found a welcome at her house when they came back to London. She had little time for hobbies, but was interested in archæology and architecture, and spent many of her holidays travelling abroad with her sister. It is sad that her death should have come as she was looking forward to a peaceful retirement, with the opportunity for doing all those things for which she had never before had time.

THOMAS HERBERT CECIL BENIANS
F.R.C.S.

Mr. T. H. C. Benians, honorary consulting pathologist to the Prince of Wales's General Hospital and to the Tottenham Group of Hospitals, died on Jan. 1 at the age of 75.

For a short time after qualifying from the London Hospital in 1907 he worked in South Africa and Rhodesia. In 1914 he was appointed pathologist to the Prince of Wales's General Hospital and later he also became part-time pathologist at the North Middlesex Hospital, where during the late war he did much to build up the blood-transfusion service. Soon after the war he gave up this post to become whole-time pathologist to the Prince of Wales's General Hospital and, within a short time, to the Tottenham Hospital Group under the National Health Service. After he retired in 1951, he continued to work sometimes as a locum at other hospitals, and when not thus engaged continued his own research in his old laboratory at the Prince of Wales's General Hospital, where he was working until a few months ago.

The North London Postgraduate Medical Institute owes much to the work which Benians put into the old North East London Postgraduate Medical College, of which he was for many years the vice-dean. He was responsible for drawing the North Middlesex Hospital, and later Chase Farm Hospital, into the scheme, and on this amalgamation the present institute was founded. The pathological museums of the institute are formed around the nucleus that was collected by Benians and his staff.

Of his position and friendships at the hospital B. H. J. writes:

Tommy Benians was a popular figure at the Prince of Wales's General Hospital, and generations of housemen came to regard him as a father confessor who would give sound advice on pathology and on many other matters not necessarily related to professional work. Such phrases as "You surprise me", "Now that's interesting", and "You must tell me more" when associated with a merry twinkle from his blue eyes encouraged the most bashful young man and conversation would flow freely. Over lunch he would often recount little incidents with great enjoyment, but never with malice and never in a manner to cause any hurt. He never claimed to be a clinician, but his advice on further investigations that might prove fruitful was often sought and often solved a clinical problem. On one occasion he listened to a junior house-physician's account of a patient brought to the casualty department who died almost within minutes, and Tommy said, "Now that's interesting: you will find that he has a rupture of the aorta into the pericardium"; and the autopsy proved the correctness of his diagnosis.

Gardening and growing flowers gave him great pleasure, and when he lived in a flat during his latter years his small allotment was a continual joy to him. He was also a keen amateur artist, and of this interest P. H. M.-B. relates:

In recent years I knew Benians more through his paintings than through his work. He was a member of the Medical Art Society and besides attending our evening sessions he exhibited from time to time some of his original and quizzical compositions. It was always good to meet him, for he possessed an unusual and refreshing turn of mind, and he preserved the same lively interest and whimsical turn of humour as in our student days at the London Hospital.

Mr. Benians leaves a widow, two sons, and a daughter.

JOSEPH LENNOX PAWAN
M.B.E., M.B. Edin., D.P.H.

Dr. Pawan, formerly bacteriologist and pathologist to the Government of Trinidad and Tobago, died at his home at Port of Spain on Nov. 3 at the age of 70.

He graduated M.B. from the University of Edinburgh in 1912, and after postgraduate work at the Pasteur Institute, Paris, and in Germany, he returned to the West Indies and took up the appointment of Government bacteriologist which he held for over a quarter of a century. He published papers on serum-calcium levels, pulmonary tuberculosis, sleeping-sickness, and the bacteriology of water-supplies and food-poisoning in the tropics, but his most important study was his articles on the transmission of paralytic rabies by the vampire bat, and he was appointed M.B.E. for his investigations into the pathology and histology of this disease. In 1954, he visited America as a consultant on rabies to the United States Government. He was invited to become joint chairman of the Rabies Committee of the World Health Organisation, but ill health forced him to decline this invitation. He is survived by his widow, one son, and two daughters.

Sir THOMAS DUNHILL

A. P. B. writes:

Thomas Dunhill was a brilliant surgeon and essentially kind, two attributes not always met with together. The two most beautiful sights I have witnessed in surgery were the late Lord Moynihan operating in the abdomen and Sir Thomas on the exophthalmic thyroid. There was no fluster; the silence was broken by the click of the forceps, though the former might discuss the latest novel. Each was gentleness personified. Lord Moynihan used to teach "Every pull is a pain". But the most impressive feature was the absence of blood despite the vascularity of the organs.

Appointments

GRIFFITH, D. H. S., L.R.C.P.E., D.P.H., D.I.H.: M.O.H., Guisborough, Loftus, Skelton, and Brotton, Yorkshire.

SACKWOOD, MARK, M.B. Lond., D.OBST.: senior assistant M.O.H. (maternal and child welfare), Middlesbrough.

SHEPHARD, R. H., M.D. Lond., F.R.C.S.: part-time consultant neurosurgeon, Derby group of hospitals.

Births, Marriages, and Deaths

BIRTHS

DAY.—On Jan. 3, to Sonia, wife of Dr. F. M. Day—a daughter, a sister for Carolyn.

DEATHS

BENIANS.—On Jan. 1, at the Prince of Wales's General Hospital, London, N.15, Thomas Herbert Cecil Benians, F.R.C.S., aged 75.

Notes and News

NEW LOOK FOR LAMBETH

"WHEN Hitler has finished bombing our cities," wrote Herbert Read during the war, "let the demolition squads complete the good work". The squads will soon be at work again on the south bank of the Thames, for the governors of St. Thomas' Hospital are planning their share of the reconstruction. The hospital was badly hit by bombing; by the end of the war seven of its thirty wards were destroyed and fourteen unusable, and it has lately been found that the buildings remaining are so unsound that they are not worth renovating. The board have a plan which entails the diversion of Lambeth Palace Road further from the river, thus doubling the area of the hospital site. They have provided a block of flats, now nearing completion, to house those whose homes will be demolished.

A completely new building is to be erected, in stages to enable the present hospital to function during the building. The main block of the new hospital, 120 yards from the river, will be 11 storeys high, containing 32 wards (827 beds) in 8 storeys; a 4-storey building, connected to it and lying between the main block and the road, will house outpatient departments and operating-theatres. Other buildings, some of them in the space between the main block and the river, will provide accommodation for nurses, residents, and students, and (it is hoped) house the medical school. The main block will be about 140 feet high, and the buildings nearer the river about 80 feet—the height of the present structure. Most of the space between wards and river will be open, allowing excellent views. The construction will be of concrete, but details of finish are not yet decided. Communication will be vertical by means of 4 towers housing lifts and stairs; the fifth and eighth floors (which will house laboratories) and the ground floor will provide horizontal communication. The wards are designed in accordance with principles enunciated by the Nuffield Provincial Hospitals Trust; each will have a central entrance and service rooms.

The Minister of Health has provisionally approved the scheme, subject to agreement on the scale of residential accommodation; it is being submitted to the Royal Fine Arts Commission and to the London County Council (the planning authority). Each of the four stages of building is estimated to take about $2^1/_2$ years, and the total cost of the hospital (excluding the medical school and the road diversion) is put at about £$7^1/_2$ million. It is hoped that building may begin some time next year.

TELEVISION PROGRAMME ON CANCER

CANCER research was the subject of a recent B.B.C. television programme. An anonymous surgeon, who admitted to eradicating rather than curing cancer, introduced several research-workers. Prof. J. F. Danielli dealt with the question "what is cancer?" and showed cinemicrographic films of normal and cancerous cells dividing. Dr. R. J. C. Harris described carcinogens, and Prof. Geoffrey Hadfield discussed the role of endocrines in breast malignancy. Dr. L. H. Gray showed a film of dividing cells, revealing clearly the influence of radiation on the chromosomes. Finally, methods were shown of testing chemicals that arrest malignant growth. Summing up, the chairman emphasised that though no cure had been discovered, research was continuing along several lines, and the final answer might come from any of them.

The symposium gave a good impression of the vigorous approach to the problem by several routes, and conveyed well the feeling that the chances of finding a cure were hopeful rather than encouraging at present. There was no attempt to talk down to the audience and the excellent animated diagrams and film clearly illustrated the points being explained. The random use of the terms "cancer", "carcinoma", and "malignancy" may have been confusing to some viewers. The production (by James McCloy) was carefully planned and well presented.

CARE OF DRUG ADDICTS

A STUDY group of the World Health Organisation has issued a report [1] on drug addiction. It is concerned solely with addiction to opium (and its derivatives and synthetic substitutes) and to cannabis derivatives. It deals with treatment, and considers prevention only as regards relapses.

Addicts are classified according to their amenability to treatment. Easiest to treat (often by mass methods) are those who fall into addiction during some temporary stress—e.g., hunger, a painful illness, or the depressive phase of cyclothymia. Harder to treat successfully are those with a basically pathological personality. There is usually immaturity of character development and a desire to live only in the present or a destructive or self-destructive tendency, besides a lack of capacity for dealing with stress. The causes may be found in emotional deprivation, lack of a parental figure to form a proper ideal (both common in broken homes), or over-indulgence during childhood; or an unrealistic attitude with standards differing from those of the patient's basic subculture. Patients may, however, move from group to group.

The fundamental need in treatment is effective control of the drugs concerned. The addict must be regarded as a patient. For those who do not respond easily to simple or mass methods, treatment will be psychotherapeutic and not essentially different from psychotherapy in other personality disorders. It should aim at giving the patient more insight, understanding of the unreal character of his neurotic fears, and a better judgment of situations. Maintenance of addiction is not treatment and should be reserved for special circumstances; withdrawal is important though only a part of treatment. It is distressing and must be done with skill, speed, and humanity, and must be fully discussed with the patient. It may be gradual or abrupt; supportive treatment, with sedatives and perhaps intravenous infusions, may be given, and in some cases electric or insulin shock therapy. The methadone substitution technique [2] is recommended; but sedatives and tranquillisers "often make the withdrawal unnecessarily dangerous".

The continued-treatment stage, which aims at reablement of the patient till he can withstand the normal stress of life without using drugs, is time-consuming but the most important. Withdrawal may be so unrewarding that the patient fails to continue treatment, or may lead to overconfidence. Over two or three years the relapse-rate is high, and the patient needs support from his physician and friends and from social agencies. The most effective method in most countries is civil commitment to medical care, with a gradual return to society through open wards and halfway houses.

The report ends by calling for further studies of the prevalence of addiction in various countries, for diagnostic tools such as a urine test for the drugs concerned, and for extensive life-histories of addicts. Annexes consider the ætiology of addiction and the legal framework of treatment in various countries.

Whitley Dispute

On Jan. 2 representatives of administrative and clerical workers in the National Health Service decided to end the ban on overtime which began on Nov. 18 as a protest against the Minister of Health's refusal to approve a 3% pay increase recommended by the Whitley Council for these workers (*Times*, Jan. 3). A fresh claim for a 5% increase is being submitted to the council; if the management side reject this claim, it could then be referred to arbitration by the Industrial court.

Royal Society of Health

On Wednesday, Jan. 15, at 2.30 P.M. at 90, Buckingham Palace Road, London, S.W.1, Dr. W. S. C. Copeman, chairman of the Empire Rheumatism Council, will speak on the problem of rheumatic diseases.

1. Treatment and Care of Drug Addicts; Report of a Study Group. *Wld Hlth Org. tech. Rep. Ser.* no. 131. World Health Organisation. Geneva, 1957. Pp. 19. 1s. 9d.
2. Vogel, U. H., Isbell, H., Chapman, K. W. *J. Amer. med. Ass.* 1948, **138**, 1019.

British Association of Allergists

The annual general meeting of this association will be held at 11 A.M. on Saturday, Jan. 18 at 1, Wimpole Street, London, W.1.

Canadian Poliomyelitis Vaccine

The first consignment of Canadian Salk vaccine arrived by air in Manchester last Saturday, on its way to the Liverpool headquarters of Evans Medical Supplies, who are handling the vaccine in this country (*Times*, Jan. 6). This batch contains four tons; and altogether 5 million doses have been ordered.

Laboratory Animals Bureau Congress

Sir Solly Zuckerman will open this two-day congress at 9.30 A.M. on Monday, March 24, at the Medical School of the University of Birmingham. Further particulars may be had from the bureau, M.R.C. Laboratories, Holly Hill, Hampstead, London, N.W.3.

Anglo-French Exchange Bursaries

Short-term grants for work in France are offered again this year to British doctors and medical research workers by the Institut National d'Hygiène, Paris. Application forms can be had from Dr. G. W. Wolstenholme, Ciba Foundation, 41, Portland Place, London, W.1. The closing date for application is Feb. 2.

Royal Commission on Remuneration

The Royal Commission on Doctors' and Dentists' Remuneration will hold public hearings on Thursday and Friday, Jan. 16 and 17, at 11.15 A.M., at Church House, Great Smith Street, London, S.W.1. Representatives of the Medical Practitioners' Union have been invited to attend on Jan. 16, and Lord Moran has been invited to attend on Jan. 17.

Conference on Work Study

This conference, convened by the British Institute of Management, will be held in Caxton Hall, London, S.W.1, on Feb. 6.

The programme will include a talk by Mr. R. P. MacMahon, deputy house-governor of the Westminster Hospital, on work study and the hospital service. Full particulars may be had from the press officer, Management House, 80, Fetter Lane, E.C.4.

The Royal Society

Sir Lindor Brown and Sir Charles Dodds have been appointed vice-presidents of the society for 1957–58.

Awards under the Society and the Nuffield Foundation Commonwealth bursaries scheme have been made to: Dr. A. J. Buller, senior lecturer in physiology, St. Thomas's Hospital Medical School, London, and Dr. W. P. U. Jackson, senior lecturer in medicine, University of Cape Town.

Roehampton Courses on Artificial Limbs

Courses on artificial limbs and rehabilitation after amputation, for consultants and senior registrars in orthopædic surgery or physical medicine, are now held at Roehampton in March and October. The next course for orthopædic surgeons will be from March 24 to 28 inclusive, and the next for specialists in physical medicine on March 5 and 6. Those interested should apply to the Principal Medical Officer, Artificial Limbs and Appliances Centre, Roehampton House, London, S.W.15.

Steroid Reference Collection

Part of the Medical Research Council's Steroid Reference Collection, formerly kept at the National Institute of Medical Research, has been moved to the Postgraduate Medical School of London.

All requests for compounds in the collection should now be addressed to Dr. W. Klyne at the School, Ducane Road, W.12. As a result of generous gifts from two industrial firms larger supplies of œstriol and 16-epi-œstriol (Organon Laboratories) and very limited supplies of racemic aldosterone (Ciba AG, Basle) are now available; these materials are intended for chemical reference purposes, and not for clinical work.

Adelaide Hospital, Dublin

An association of old students of this hospital is being formed. All old students are asked to write giving their names and addresses to the secretary, Association of Old Adelaide Students, Adelaide Hospital, Peter Street, Dublin.

Major-General F. C. Hilton-Sergeant has succeeded Air Commodore H. A. Hewat as medical adviser to the British Red Cross Society.

Prof. W. C. W. Nixon is to visit the United States in February to attend the annual session of the Obstetrical and Gynecological Assembly of Southern California at Los Angeles.

CORRIGENDA: The new medical dictionary which the late Dr. L. E. Napier was preparing is to be published by the Caxton Publishing Company, Ltd., and not the Caxton Press as stated in our obituary (Dec. 28, p. 1343).

The Ankle-jerk in Early Hemiplegia.—In Dr. Buller's paper (Dec. 21, p. 1262) the tracings in the lower part of fig. 4 were wrongly labelled. The right-hand tracing recorded the left ankle-jerk and the left-hand tracing the right jerk.

Diary of the Week

JAN. 12 TO 18

Tuesday, 14th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Dr. Aubrey Leatham: Auscultation of the Heart (First Goulstonian lecture).

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. D. J. Trevan: Some Mechanisms of Tumour Metastasis. (Imperial Cancer Research Fund lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry.* Dr. Doris Odlum, Dr. Phyllis Epps, Dr. I. R. C. Batchelor, Dr. I. M. H. MacAdam: Legal Aspects of Suicidal Acts.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. L. E. Glynn: Structure and Stability of Collagen in Relation to Disease of Connective Tissue.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Mr. Stanley Clayton: Pelvic Tuberculosis.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
5.30 P.M. Prof. F. C. Ormerod: Development of the Sinuses.

BIRMINGHAM MEDICAL INSTITUTE, Harborne Road, Edgbaston
8 P.M. *Psychiatry.* Dr. Willy Mayer-Gross: Psychiatry in an Industrial Community. (Valedictory address.)

MANCHESTER MEDICAL SOCIETY
8 P.M. *Surgery.* (Clinical Sciences Building, York Place, Manchester, 13.) Mr. Alan Nicholson: Choledochoscopy.

Wednesday, 15th

ROYAL SOCIETY OF MEDICINE
8.15 P.M. *General Practice.* Dr. R. E. Hope Simpson, Dr. A. T. Roden, Dr. J. M. Ritchie: The Common Cold.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. Arthur Tickner: Biochemistry of Hormones, II—Non-Steroids.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. N. S. Plummer: Broncho-Pulmonary Aspergillosis.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow.
5 P.M. Dr. Sheila Sherlock: Hepatic Coma. (Lock lecture.)

Thursday, 16th

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Dr. Leatham: Auscultation of the Heart. (Second of two Goulstonian lectures.)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Prof. G. Payling Wright: Cell Regeneration and Pathological Processes.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Dr. J. R. Mallard, Dr. A. W. G. Goolden: Use of ^{132}I in Serial Tests, Double Isotope Investigations, and Normal Variations of Thyroid Function. Dr. K. E. Halnan: Advantages Obtainable from use of ^{132}I for Thyroid Function Tests.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Dr. A. R. D. Adams, Prof. A. W. Woodruff, Mr. D. P. Choyce, Dr. Frank Hawking, Dr. W. E. Kershaw: Onchocerciasis.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Dr. A. C. Kirby. Dr. Philip Pinkerton, Mr. P. P. Rickham, Dr. Thomas Seager: Enuresis.

MANCHESTER MEDICAL SOCIETY
8 P.M. *Anæsthetics.* (Staff House, University of Manchester.) Dr. W. J. Glover: Aspects of Pædiatric Anæsthesia. Dr. Elizabeth Hurley: Aspects of Thiopentone.

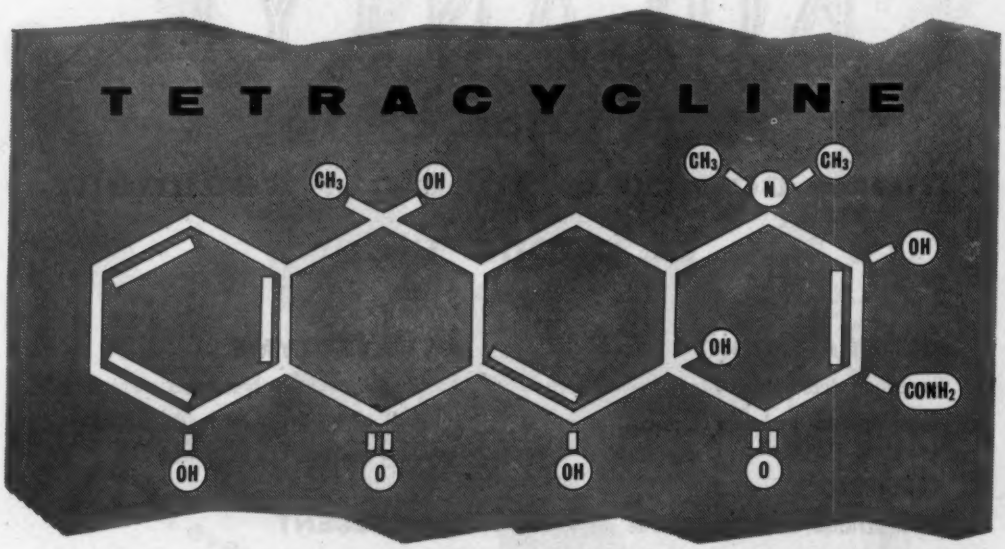
UNIVERSITY OF ST. ANDREWS
5 P.M. (Queen's College, Dundee.) Mr. D. J. Waterston: Emergency Surgery in the New Born.

Friday, 17th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Epidemiology and Preventive Medicine.* Mr. R. G. Veryard, Mr. A. T. Lawrence, Dr. P. J. Lawther, Dr. Bernard Waddy: Weather and Disease.
8.15 P.M. *Radiology.* Miss Geraldine Barry, Mr. G. W. Blomfield, Dr. A. W. G. Goolden: Thyroid Carcinoma.

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
10 A.M. Mr. W. B. Gabriel: Prolapse of the Rectum.
4 P.M. Dr. D. V. Hubble: Chronic Thyroiditis.

Turning



to the very best advantage

Medical history has already reserved a special place for ACHROMYCIN tetracycline because of its impressive therapeutic potency and remarkably broad spectrum. Now, with the advent of ACHROMYCIN V, the therapeutic merits of tetracycline are turned to still greater advantage. Presenting tetracycline in company with sodium metaphosphate, ACHROMYCIN V achieves swifter, more efficient, more complete absorption. As a result, the therapy becomes still more secure, without any increase in daily dosage or cost. Customary adult dosage is a single capsule (250 mg.) four times daily—though this may safely be increased in unusually severe conditions.

ACHROMYCIN*

TETRACYCLINE WITH SODIUM METAPHOSPHATE *REGD. TRADE MARK

Each oral capsule contains ACHROMYCIN tetracycline 250 mg: Sodium Metaphosphate, 380 mg. Bottles of 16, 100 and 1,000. ACHROMYCIN V is also available as an orange-flavoured syrup containing in each 5 c.c. 125 mg. of tetracycline activity. Bottles of 2 and 16 fl. oz.

Lederle

LEDERLE LABORATORIES DIVISION

Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

KOLANTYL

for more complete medical treatment of peptic ulcer

ANTISPASMODIC

To reduce ulcer pain and to delay stomach emptying, so assisting antacid action.

ANTACID

To neutralise excess acid. The antacid component of 'Kolantyl' is virtually ideal; rapid and prolonged in action, neither laxating nor constipating.

ANTILYSOZYME

To inhibit excess lysozyme, which is believed to be a factor in the aetiology of peptic ulcer.

DEMULCENT

To ensure ingredients adhere to mucosal surfaces and to assist in protecting the ulcer crater.

"... may be safely tried out under G.P. conditions with every prospect of a good result ..."
Medical World (1955) 82: 379

Formula

Each tablet or 10 c.c. of Gel contains:

'Merbentyl' (diethylaminocarbethoxybicyclohexyl hydrochloride)	5 mg.
Dried Aluminium Hydroxide Gel	400 mg.
Heavy Magnesium Oxide	200 mg.
Sodium Lauryl Sulphate	25 mg.
Methylcellulose	100 mg.

Gel

Bottles of 12 fl. oz.

Tablets

Cartons of 48 and 240 tablets in roll packs of 12.

Dosage

1 to 2 tablets (2 to 4 teaspoonfuls of Gel) 3 or 4 times a day.

Merrell Research

'Kolantyl' and 'Merbentyl' are registered trade marks of the Wm. S. Merrell Co.

Distributed in Great Britain and Republic of Ireland by
RIKER LABORATORIES LTD.
LOUGHBOROUGH, LEICS.

SAFE · SURE · SIMPLE & SPEEDY

the Viule injection technique in use throughout the world, offers outstanding advantages at no extra cost. Details of the syringe and a list of the wide range of drugs available will be gladly sent on request.

Literature and further information gladly sent on request

BOOTS PURE DRUG COMPANY LIMITED NOTTINGHAM ENGLAND

Boots

S 303

"All right Mr. Baxter, shall we continue? . . .

. . . now that you seem to be getting the idea, just let me reiterate that I.Z.S., as you so neatly put it, 'has something the other insulins haven't got.' In other words, in about 90 per cent. of patients the blood-sugar level can be controlled for up to 24 hours with a single injection of I.Z.S.

When you compare the various insulins available, you'll find that no other form is so universal in its application as I.Z.S. This is, among other things, because I.Z.S. does not contain any protein or peptide material other than the insulin itself, and is therefore practically free of any allergic reactions. Perhaps Mr. Baxter will now give others a chance to raise their questions."

I.Z.S. A.B. Vials of 10 c.c.
40 or 80 units per c.c.

I.Z.S. (Amorphous) A.B.
Vials of 10 c.c. 40 units per c.c.

I.Z.S. (Crystalline) A.B.
Vials of 10 c.c. 40 units per c.c.

Insulin Zinc Suspension A.B.

A/B TRADE MARK

Joint Licensees and Manufacturers:

ALLEN & HANBURYS LTD LONDON E2 • THE BRITISH DRUG HOUSES LTD LONDON N1

Where

every ounce

counts . . .

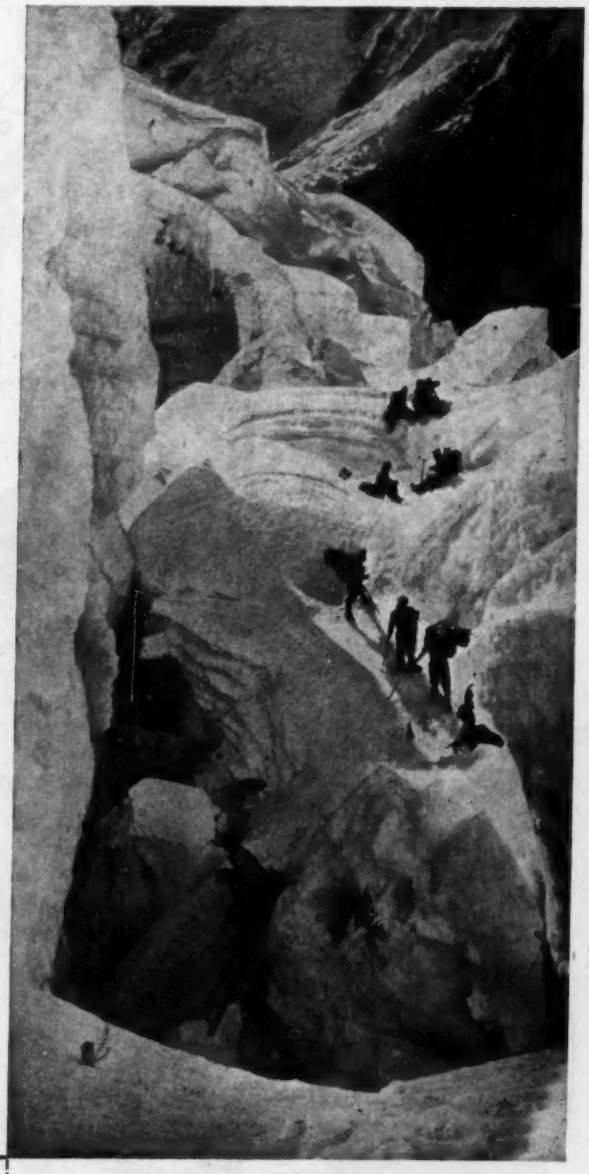
Bellergal tablets were carried to the summit of Everest by the members of the 1956 Swiss Expedition and widely used to counteract the psychosomatic effects of stress at high altitudes.

Bellergal

BY **SANDOZ**

is effective at all levels (central, sympathetic, parasympathetic) in the symptomatic treatment of a wide variety of psychosomatic disorders.

— 0.1 mg. total alkaloids of belladonna
0.3 mg. Ergotamine Tartrate B.P.
20 mg. Phenobarbitone B.P.



Original Everest Expedition photograph
kindly supplied by the
Swiss Foundation for Alpine Research

Sandoz Products Limited

Sandoz House

23 Great Castle Street

London, W.1

"Yes, Doctor, I'm right in the picture with **SCOTT'S Twin-Pack"**

A. & R. SCOTT LTD., 10 VICTORIA ROAD, LONDON, N.W.10

For Influenza

Phalcin Tablets have these advantages over Tab. Codein Co.

1 The Aspirin content being in soluble form is less likely to cause gastric disturbance.

2 The inclusion of Pholcodine eliminates the side effects of Codein.
Phalcin has negligible constipant action.

3 The caffeine content provides useful stimulant action.

For the reduction of high temperature in cases of influenza, acute rheumatism, tonsillitis, and other conditions producing pyrexia.

DOSAGE:— 2 *tablets three times daily.*

FORMULA

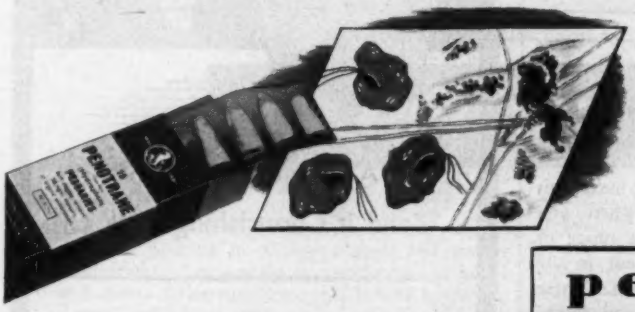
Acid Acetylsalicyl	.. 3 *grains*
Phenacetin ..	.. 2 *grains*
Caffeine ..	.. ½ *grain*
Pholcodine ..	1/12*th grain*
Calc. Carb. ..	.. 1 *grain*

Professional samples available on request

PHILIP HARRIS LTD

144 Edmund Street, Birmingham 3

Telephone: Central 4211 (5 lines). Telegrams: "Science, Birmingham."



Effective against both Trichomonas and Monilia

penotrane

PHENYLMERCURIC DINAPHTHYLMETHANE DISULPHONATE

in vaginal therapy

The powerful trichomonacidal and fungicida properties of PENOTRANE present the greatest advantage in the treatment of vaginal discharge, particularly trichomonal vaginitis and moniliasis. PENOTRANE is also strongly bactericidal and it deeply penetrates the vaginal mucosa. Both the Pessaries and Vaginal Cream are buffered to approximate the normal vaginal acidity.

INDICATIONS: ★ Vaginal Discharge due to trichomonal, monilial and coccal infections. ★ Pruritus Valvae. ★ Obstetrical Lubrication. ★ Pre-operative Skin Disinfection.

Literature and professional samples on request.

AVAILABILITY:

PENOTRANE	Applicator Sets—containing Penotrane Vaginal Cream & disposable applicators.
PENOTRANE	Aqueous Solution — Bottles of 100, 500 and 2,000 c.c.
PENOTRANE	Jelly—Tubes of 1 oz.
PENOTRANE	Pessaries—Cartons of 15 and 100.
PENOTRANE	Powder — Polythene Insufflating Containers.
PENOTRANE	Tincture—Bottles of 15, 100, 500 and 2,000 c.c.

A SWED MEDICAL PRODUCT

WARD, BLENKINSOP & COMPANY, LIMITED

YORK HOUSE, 37, QUEEN SQUARE, LONDON, W.C.1.

Telephone: HOLborn 5992/6 (5 lines.) Telegrams: Duochem, Westcent, London.

43

Help them to get the best from HEALTH LAMP treatment

You can be sure that your patients obtain the maximum benefits from health lamp treatment when you recommend Hanovia health lamps. The range of prescription models provides this treatment in the patient's own home in its most effective form. These lamps incorporate many of the known and tested qualities of the Hanovia actinotherapy equipment which is used and trusted in clinics and hospitals. Every type of Hanovia equipment is backed by the advantages of over forty years' experience in the provision of ultra-violet or infra-red treatment for medical purposes.

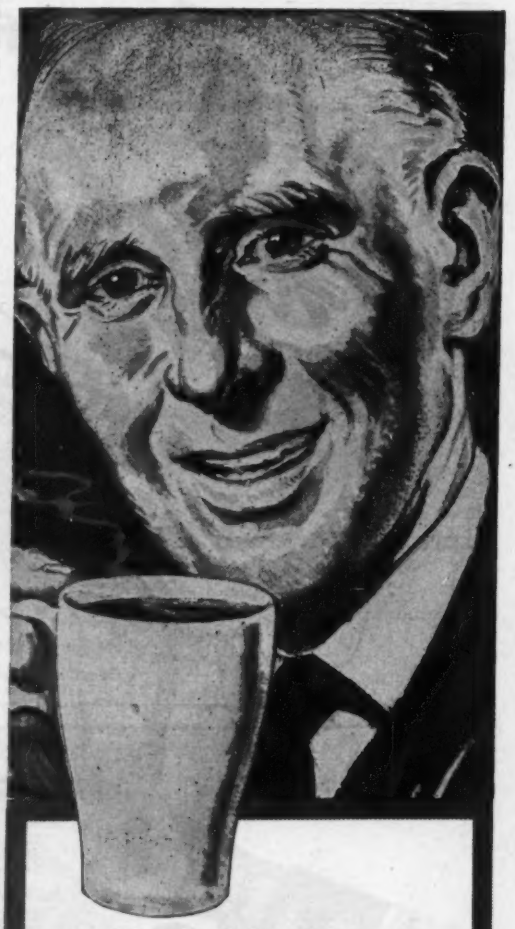
Full details of all Hanovia health lamps available on request

Hanovia

SLOUGH, BUCKS. (TEL: BURNHAM 500)

Specialists in ultra-violet and infra-red equipment.

TGA H228



'A splendid nightcap and it's nourishing too!'

Bourn-vita is made from malt, milk, sugar, cocoa and eggs

sleep sweeter

BOURN-VITA

made by CADBURYS

SUPPLIES OF THIS FOLDER ARE AVAILABLE FREE OF CHARGE

"Reducing Your Weight" is a new and easily followed guide to diet for weight reduction, and includes some simple advice and a varied menu. The folder is designed for handing to the patient, whose name may be written in a space provided on the cover.

Quantities of this folder are available free of charge to medical practitioners. For a supply, or a specimen copy, write to the Energen Dietary Service at the address below.

The Energen Dietary Service, staffed by qualified dietitians and under medical supervision, offers information and practical assistance in all dietary and nutritional problems. All services are free of charge, and practitioners are invited to apply for details.

Available in the U.K. only.

The Secretary

ENERGEN DIETARY SERVICE

25a, Bryanstone Square, London, W.1. Tel: AMBassador 9332

In the Service...

Research

The House of Wander continues to maintain its advanced position in pharmaceuticals and quality food products because the standardization of active ingredients during manufacture is backed by careful control and investigation in its extensive Research Laboratories.

In Quality

The Wander Research Laboratories have made useful contributions in the fields of dietetics, nutrition and vitamins. Their wide experience and up-to-date laboratory facilities help to maintain the high quality of Malt Extract and Cod Liver Oil (Wander) the vitamin content of which exceeds that of the analogous B.P. preparations.

The special consideration of physicians when prescribing a malt and oil preparation is that of vitamin values. Comparative studies prove that to prescribe "Wander Brand" is to specify malt extract and cod liver oil of the finest possible quality.

In the Service of Medicine

Careful control and investigation help to maintain "Wander Brand" in the forefront of its class. Moreover, with all its special advantages, "Wander Brand" costs no more than some malt and oil preparations with a lower vitamin content.

A. WANDER LTD.
LONDON W.1.

℞ Malt & Oil (WANDER)

M.352

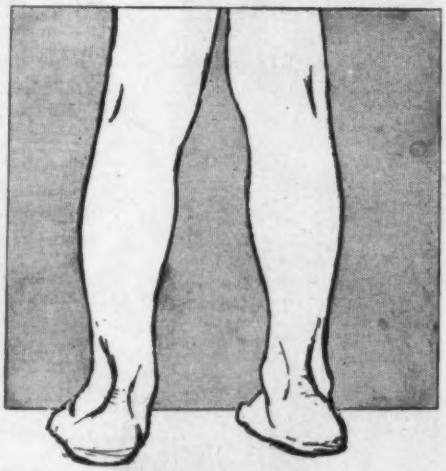
How do *YOU* tackle flat foot?

. . . do you prescribe an external wedge on the shoes?

BUT the wedges soon wear away; and very often the child is made to feel self-conscious because his shoes look different from other children's.

Surely it's more logical to have a wedge *built-in* between the inner and outer sole—invisible, and completely unaffected by wear or repair of the shoe. That is how Start-rite INNERAZE shoes are made; why they are the only practical solution to this problem.

Information from Mr. W. J. Peake, James Southall & Co. Ltd., Crome Road, Norwich.



INNERAZE

Invisible Wedge shoes by START-RITE

(who make the finest children's shoes of all types)

Inneraze Shoes are supplied only against medical prescription

CLIFFDEN, TEIGNMOUTH

For the early treatment of nervous disorders and patients needing rest and care

A well-appointed House with spacious balconies and extensive views of the South Devon Coast. Beautiful garden and own dairy in 35 acres In the same grounds, **ROWDENS**, a comfortable house with lovely views. Private road to the beach

There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 25 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—TEIGNMOUTH 289 and 537

HEIGHAM HALL, NORWICH

PRIVATE MENTAL HOME for Nervous and Mental illness. All types of treatment carried out. Accommodation for Alcoholics and Addicts available. Special Geriatric Unit now open. Fees from 7 gns. per week upwards according to requirements.

Apply to Dr. J. A. SMALL Telephone: Norwich 20080

CHISWICK HOUSE

PINNER, MIDDLESEX

Telephone: PINNER 234

A private Nursing Home for patients suffering from all forms of Nervous and Psychological illness. Forty-four patients of both sexes. A certain number of elderly patients received. All modern forms of treatment. Psychotherapy, Electroplexy, Modified Insulin, etc. Two country houses in adjoining grounds of 5 and 6 acres each respectively, 12 miles north-west of London. Frequent trains Baker Street Station to Pinner. One-quarter of a mile from Pinner Station.

Apply to the Medical Director, DOUGLAS MACAULAY, M.D., D.P.M.

BOWDEN HOUSE

HARROW-ON-THE-HILL, MIDDLESEX

Established in 1911 Tel.: BYRon 1011 & 4772

(Incorporated Association not carried on for profit)

A private clinic for the treatment of the neuroses and nervous disorders by psychotherapy and all modern physical therapies.

Apply: MEDICAL DIRECTOR

SPRINGFIELD HOUSE

Near BEDFORD

Phone: BEDFORD 3417

for MENTAL CASES (including the aged)

Fees from Ten Guineas per week

For forms of admission, &c., apply to the Resident Physician CEDRIC W. BOWER.

INTERVIEWS IN LONDON BY APPOINTMENT.

RUTHIN CASTLE, NORTH WALES

A Private Clinic, the first in Great Britain, for investigation and treatment of all forms of disease, except infectious and mental

Nursing, dietetic, massage, x-ray and laboratory departments **Central heating and a lift to all floors**

Inclusive charges Apply SECRETARY Telephone: Ruthin 66

ST. ANDREW'S HOSPITAL

FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

PRESIDENT: THE EARL SPENCER

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE. This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK. Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL. The seaside home of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354, 3 lines), who can be seen in London by appointment.

THE MEDICAL PROTECTION SOCIETY LIMITED

Over 60 years experience in medical defence and protection

Complete indemnity granted to members in cases undertaken on their behalf

ANNUAL SUBSCRIPTION: £1 for first three years for newly qualified entrants and £2 thereafter

Full particulars from the Secretary (Dr. Alistair French), **Victory House, Leicester Sq., W.C.2.** Gerrard 4553 and 4814

Vacancies

ACADEMIC AND EDUCATIONAL SECTION *Page* 49

ADMINISTRATIVE

Birmingham R.H.B. Deputy Sr. Admin. M.O. 50
Leeds R.H.B. Regional Psychiatrist 50

ANÆSTHETICS

Connaught, E.17. Sr. H.O. 51
North East Met. R.H.B. Regs. .. 51
South London Hosp. for Women & Child., S.W.4. Reg. 52
St. Giles', S.E.5. Sr. H.O. 52
St. Thomas's, S.E.1. P.-t. Cons. .. 50
Willesden Gen., N.W.10. Locum Reg. 52
Glasgow Royal Infy. Sr. H.O. .. 56
Leeds R.H.B. Reg. 57
Leeds United Hosps. R.H.B. Sr. Reg. 57
Luton & Dunstable. Reg. 57
Mexborough. Montagu. Reg. .. 58
Newcastle R.H.B. Cons. 50
Nottingham Gen. Sr. H.O. 59
Oxford United Hosps. Sr. H.O. .. 59
Plymouth. South Devon & East Cornwall. Sr. H.O. 60
Stockport Infy. Sr. H.O. 61
Warrington Infy. Sr. H.O. 62
Watford Hosps. Reg. 62
West Cumberland H.M.C. Jr. H.M.O. 62
Winchester Group H.M.C. Reg. .. 62
U.S.A. University of Minnesota Med. Center. Residencies. 63

BACTERIOLOGY

Newcastle United Hosps. Reg. & Sr. H.O. 59
Scotland. North-Eastern R.H.B. Cons. 50

BIOCHEMISTRY

Scotland. Western R.H.B. Reg. .. 61

CASUALTY

Acton, W.3. Sr. H.O. 51
London, E.1. Reg. 51
North Middlesex, N.18. Sr. H.O. .. 51
Royal Northern, N.7. Reg. 51
South London Hosp. for Women & Child., S.W.4. P.-t. Sr. H.O. .. 52
St. Mary's, W.2. Sr. H.O.'s. 52
Westminster Child's, S.W.1. H.O. or Sr. H.O. 52
Aberdeen Gen. Hosps. B.O.M. H.O. 52
Blackburn Royal Infy. Jr. H.M.O. or Sr. H.O. 53
Brighton. Royal Sussex County. H.O. 54
Brighton. Royal Sussex County. Jr. H.M.O. or Locum 54
Huddersfield Royal Infy. Jr. H.M.O. or Sr. H.O. 56
Kettering & Dist. Gen. Sr. H.O. .. 56
Maidstone. West Kent Gen. Sr. H.O. 57
Plymouth. South Devon & East Cornwall. Sr. H.O.'s 60
Rochester, Kent. St. Bartholomew's. Sr. H.O. 60
Romford. Oldchurch. Sr. H.O. .. 60
Rugby. Hosp. of St. Cross. Jr. H.M.O. 60
Sidcup. Queen Mary's. Sr. H.O. .. 61
Southampton. Royal South Hants. Sr. H.O. 61
Southend Gen. Temp. Reg. 61
Stockton & Thornaby. Locum Sr. H.O. 61
Windsor. King Edward VII. Sr. H.O. 62

CHEST AND TUBERCULOSIS

Birmingham (Sanatoria) Group H.M.C. Jr. H.M.O. 53
Manchester R.H.B. Reg. 58
Manchester R.H.B. Reg. 58
Salford. Ladywell. Jr. H.M.O. .. 60

DENTAL SURGERY

Hosp. for Sick Child., W.C.1. Sr. H.O. 52

DERMATOLOGY

Newcastle United Hosps. H.O. .. 58

EAR, NOSE, AND THROAT

Metropolitan E.N.T., W.8. P.-t. Clin Assts. 51
St. Mary's Hosp., Child's Dept., W.10. P.-t. Clin. Asst. (G.P.) 52
Aberdeen Gen. Hosps. B.O.M. H.O. 52
Aberdeen. Royal Hosp. for Sick Child. H.O. 52
Altrincham Gen. Reg. 53
Birmingham & Midland Ear & Throat. Sr. H.O. & H.O. 53
Bournemouth. Royal Victoria. Sr. H.O. 53
Leeds United Hosps. Sr. H.O. .. 57
Maidstone. Kent County Ophthalmic and Aural. Sr. H.O. 58
Northampton Gen. Sr. H.O. 59
Sheffield United Hosps. & R.H.B. Sr. Reg. 60
Southampton. Royal South Hants. & Gen. Sr. H.O. 61
Taunton & Somerset. H.O. 62
Wolverhampton. Royal. Pre-reg. H.O. 63

GERIATRICS

Whipps Cross, E.11. H.O. 52
Birmingham R.H.B. Cons. 50
Blackburn & Dist. H.M.C. Jr. H.M.O. 53
Newcastle R.H.B. Locum P.-t. Cons. 50
Watford. Shrodells. Sr. H.O. .. 62

INFECTIOUS DISEASES

South Lodge, N.21. Sr. H.O. 52
Greenock. Gateside I.D. Jr. H.M.O.'s 56
Plymouth. Scott Isolation. H.O. .. 60
Stoke-on-Trent. Bucknall. Jr. H.M.O. 61

MEDICINE

National Temperance, N.W.1. Pre-reg. H.O. 51
Queen Mary's Hosp. for the East End, E.15. H.O. 51
St. Andrew's, E.3. H.O. 52
St. Giles', S.E.5. Sr. H.O. 52
St. Mary's, W.2. Reg. 52
Bangor. Caernarvon & Anglesey Gen. H.O. 53
Barnstaple. North Devon Infy. Pre-reg. H.O. 53
Bedford Gen. Pre-reg. H.O. 53
Buxton. Devonshire Royal. Sr. H.O. 54
Cardiff United Hosps. Reg. 55
Chelmsford H.M.C. Locum Reg. .. 55
Colchester Group H.M.C. H.O.'s & Locum Reg. 54
Colwyn Bay & West Denbighshire. Jr. H.M.O. 55
Edgware Gen. H.O. 55
Gt. Yarmouth & Gorleston Gen. H.O. or Sr. H.O. 55
Hertford County. H.O. 56
Huddersfield Royal Infy. H.O. .. 56
Huddersfield. St. Luke's. Jr. H.M.O. 56
Hull. Kingston Gen. Pre-reg. H.O. .. 56
Kendal. Westmorland County. Sr. H.O. 56
Lymington, Hants. Sr. H.O. 57
Macclesfield. Pre-reg. H.O. 57
Manchester R.H.B. Reg. 58
Manchester United Hosps. Sr. H.O. .. 58
Newcastle R.H.B. Cons. 50
Newcastle. Walker Gate. Pre-reg. H.O. 58
Northwood. Mount Vernon. H.O. .. 59
Nottingham City. H.O. 59
Nottingham Gen. Pre-reg. H.O. .. 59
Portsmouth Group H.M.C. Sr. H.O.'s and Pre-reg. H.O.'s. 60
Romford. Rush Green. Sr. H.O. & H.O. 60
Rotherham Hosp. & Rosehill Hosp. Annexe. H.O. 60
Rotherham. Moorgate Gen. H.O. .. 60
Salisbury Gen. H.O. 60
Slough. Upton. Pre-reg. H.O. 61
Southampton Gen. H.O. 61
Stockport. Stepping Hill. Sr. H.O. .. 61
Stoke-on-Trent. North Staffs. Royal Infy. Pre-reg. H.O. 61
Welsh R.H.B. Reg. 62
Wigan & Leigh H.M.C. Pre-reg. H.O. 62
Windsor. King Edward VII. Pre-reg. H.O. 62
Wolverhampton. Royal. Pre-reg. H.O.'s 62

NEUROSURGERY

London, E.1. Sr. Reg. 51
Derby. Derbyshire Royal Infy. Reg. 53

(Continued overleaf)

OBSTETRICS AND GYNÆCOLOGY
Hosp. for Women, W.1. Sr. H.O. .. 51
Hosp. of St. John & St. Elizabeth, N.W.8. Hon. Asst. 50
North East Met. R.H.B. Reg. .. 51
South London Hosp. for Women & Child., S.W.4. H.O. 52
Birmingham. Marston Green Maty. H.O. 53
Birmingham R.H.B. Sr. Reg. & Regs. 53
Bury St. Edmunds. West Suffolk Gen. Locum Pre-reg. H.O.'s .. 54
Canterbury, Kent & Canterbury. H.O. 54
Cardiff H.M.C. Sr. H.O. 55
Edinburgh. Chalmers. H.O. .. 55
Hastings. Buchanan. H.O. 56
Leeds R.H.B. Reg. 57
Leeds United Hosps. R.H.B. Sr. Reg. 57
Macclesfield. Pre-reg. H.O. 57
Manchester R.H.B. Reg. 58
Newcastle R.H.B. Locum P.-t. Cons. 50
Newcastle R.H.B. Reg. 58
Northwood. Mount Vernon. H.O. .. 59
Paisley & Dist. Maty. Unit. H.O.'s .. 59
Southampton Gen. Pre-reg. H.O. .. 61
St. Albans City. Reg. 61
Sunderland. Royal Infy. H.O. or Sr. H.O. 61
Swindon & Dist. H.M.C. H.O.'s .. 61
Windsor. King Edward VII. H.O. .. 62

OPHTHALMOLOGY
Brighton. Sussex Eye. H.O. .. 54
Leicester Royal Infy. Sr. H.O. .. 57
Maidstone. Kent County Ophthalmic & Aural. Sr. H.O. 57
Manchester United Hosps. Reg., Sr. H.O. & Pre-reg. H.O. 58
Nottingham Eye. Sr. H.O. 59

ORTHOPÆDICS
Albert Dock Orthopædic & Fracture, E.16. Sr. H.O. 50
Central Middlesex, N.W.10. Pre-reg. H.O. 51
Aberdeen Gen. Hosps. B.O.M. H.O.'s 52
Birmingham R.H.B. Regs. .. 53
Brighton Gen. H.O. 54
Burton-on-Trent. Gen. H.O. .. 54
Bury St. Edmunds. West Suffolk Gen. Pre-reg. H.O. or Sr. H.O. & Locum Pre-reg. H.O.'s 54
Cambridge United Hosps. H.O. .. 54
Cardiff United Hosps. Reg. .. 55
Derby. Derbyshire Royal Infy. Sr. H.O. 55
Ilford. King George. Sr. H.O. .. 56
Kingston, Surrey. Sr. H.O. 56
Leeds United Hosps. Sr. H.O. .. 57
Newcastle R.H.B. Reg. 58
Nottingham City & Nottingham Child's. Reg. 59
Paisley. Royal Alexandra Infy. H.O. 59
Portsmouth Group H.M.C. Sr. H.O. and Pre-reg. H.O. 60
Sheffield, City Gen. Pre-reg. H.O. .. 60
South East Met. R.H.B. Reg. .. 61
Tunbridge Wells. Pembury. Sr. H.O. 62
Watford. Peace Memorial. H.O. .. 62
Welsh R.H.B. Locum Cons. 50
Northern Ireland Hosps. Auth. Reg. 63

PÆDIATRICS
Hosp for Sick Child., W.C.1. Sr. H.O.'s 52
Queen Elizabeth Hosp. for Child. H.O. 52
South London Hosp. for Women & Child., S.W.4. Locum P.-t. Reg. .. 52
St. Thomas's, S.E.1. P.-t. Cons. .. 50
Bradford Child's. Sr. H.O. 54
Carshalton. Queen Mary's Hosp. for Child. Reg. 54
Derby. Derbyshire Child's. Sr. H.O. 55
East Anglian R.H.B. Reg. 55
Isleworth. West Middlesex. Reg. .. 56
Liverpool United Hosps. P.-t. Cons. 50
Liverpool United Hosps. Sr. H.O. .. 57
North East Met. R.H.B. Reg. .. 51
Nuneaton. George Eliot. H.O. .. 59
Portsmouth Group H.M.C. H.O.'s. . 60
Warwick. H.O. 62
Wolverhampton. Royal. Pre-reg. H.O. 63
B.W.I. University College Hosp. Reg. or Sr. Reg. 63

PATHOLOGY
London Chest (Country Branch). Reg. 51
Royal Free, W.C.1. Assistants .. 51
South London Hosp. for Women & Child., S.W.4. Sr. H.O. 52
Birmingham R.H.B. Reg. 53
Carshalton. St. Helier. Sr. Reg. .. 54
Enfield. Chase Farm. Sr. H.O. .. 55
Manchester Group Pathology Lab. Sr. H.O. 58
Nottingham City. Sr. H.O. 59
Rochdale & Dist. H.M.C. Sr. H.O. .. 60
Scotland. Western R.H.B. Reg. .. 61
Sheffield R.H.B. Cons. 50
Woking & Chertsey Group Lab. Sr. H.O. 62

PHYSICAL MEDICINE
North West Met. R.H.B. P.-t. Cons. 50
Cambridge United Hosps. Reg. or Sr. Reg. 54

PLASTIC SURGERY
Scotland. Western R.H.B. Reg. .. 61
Windsor Group of Hosps. Reg. .. 62

PSYCHIATRY
North East Met. R.H.B. Reg. .. 51
Birmingham. All Saints'. Sr. H.O. .. 53
Bristol. Stoke Park Group H.M.C. Jr. H.M.O. 54
East Anglian R.H.B. Reg. 55
Gloucester. Horton Road and Coney Hill Hosps. Jr. H.M.O. 56
Leeds R.H.B. Sr. Regs. and Regs. .. 57
Manchester. Prestwich. Sr. H.O. .. 58
Murthly, Perthshire. The Hosp. Sr. H.O. 58
Newcastle R.H.B. Reg. 58
Northampton. St. Andrew's. Sr. Reg. 59
Northampton. St. Crispin. Sr. H.O. .. 59
North West Met. R.H.B. Sr. H.M.O. 50
Nottingham. Mapperley. Reg. .. 59
Oxford. Warneford & Park. Sr. H.O. 59
Scotland. Eastern R.H.B. Reg. .. 61
Warwick. Central Mental. Sr. H.O. .. 62
Welsh R.H.B. Reg. 62
Wigan & Leigh H.M.C. Sr. H.O. .. 62

RADIOLOGY
Birmingham R.H.B. Reg. 53
Birmingham United Hosps. Reg. .. 53
Colchester Group H.M.C. Locum Cons. 50
Sheffield United Hosps. Reg. .. 60

RADIOTHERAPY
Marie Curie, N.W.3. Sr. H.O. .. 51
Middlesex, W.1. Reg. 51
Middlesex, W.1. & North West Met. R.H.B. Sr. Reg. 51
St. Bartholomew's, E.C.1. Sr. H.O. .. 52
Cambridge United Hosps. Sr. H.M.O. 50
Manchester R.H.B. Reg. 55
Northwood. Mount Vernon. H.O.'s. . 59

RHEUMATOLOGY
Leeds R.H.B. Reg. (Research) .. 57

SURGERY
Hammersmith Hosp. & P.G. Med. School, W.12. Reg. 51
Highlands Gen., N.21. H.O. 51
Hosp. for Sick Child., W.C.1. Sr. Reg. & Sr. H.O. 52
Mildmay Mission, E.2. Pre-reg. H.O. 51
Mile End, E.1. H.O. 51
National Temperance, N.W.1. Pre-reg. H.O.'s 51
North Middlesex, N.18. Locum Reg. 51
Paddington Gen., W.9. Reg. .. 51
South Western, S.W.9. Pre-reg. H.O. 52
St. Charles', W.10. Pre-reg. H.O. .. 52
St. James', S.W.12. Sr. H.O. .. 52
St. Nicholas, S.E.18. H.O. 52
Alton Gen. H.O. 53
Altrincham Gen. Jr. H.M.O. 53
Ashford, Middlesex. H.O. 53
Bangor. Caernarvon & Anglesey Gen. H.O. 53
Barnstaple. North Devon Infy. H.O. 53
Batley. Gen. Sr. H.O. 53
Bedford Gen. H.O. 53
Birmingham. Dudley Road. H.O.'s 53
Birmingham R.H.B. Reg. 53
Bishop Auckland. Gen. H.O. .. 54
Bishop's Stortford. Herts & Essex Gen. Sr. H.O. 54
Blackburn & Dist. H.M.C. H.O.'s .. 54
Bolton & Dist. H.M.C. H.O.'s .. 54
Bournemouth. Royal Victoria. H.O. 53
Brighton. Royal Sussex County. Pre-reg. H.O. 54
Burton-on-Trent. Gen. Pre-reg. H.O. 54
Bury & Rossendale H.M.C. Pre-reg. H.O.'s 54
Caerphilly. H.O. 54
Canterbury. Kent & Canterbury. H.O. 54
Cardiff United Hosps. Sr. H.O. .. 55
Chelmsford & Essex. Pre-reg. H.O. 55
Cheltenham Gen. H.O. 55
Chertsey. St. Peter's. Sr. H.O. or Pre-reg. H.O. 55
Chesterfield Royal. Sr. H.O. or H.O. 55
Colchester Group H.M.C. H.O.'s .. 54
Doncaster Royal Infy. Pre-reg. H.O. or Sr. H.O. 55
Dorchester. Dorset County. Pre-reg. H.O. 55
Driffield. East Riding Gen. Sr. H.O. 55
East Grinstead. Queen Victoria. H.O. 55
Ebbw Vale, Mon. Jr. H.M.O. & Sr. H.O. 55
Enfield. Chase Farm. H.O. 55
Epping. St. Margaret's. Sr. H.O. .. 55
Glasgow. Royal Hosp. for Sick Child. Pre-reg. H.O.'s 56
Gravesend & North Kent. H.O. .. 55
Hemel Hempstead. West Herts. Pre-reg. H.O.'s 56
Hereford. County. H.O. 56
Hertford County. Pre-reg. H.O. .. 56
Huddersfield Royal Infy. H.O. .. 56
Hull. Victoria Hosp. for Sick Child. H.O. 56
Ipswich & East Suffolk. Pre-reg. H.O.'s 56
Isle of Wight Group H.M.C. Sr. H.O. 56
Isleworth. West Middlesex. H.O. .. 56
Kingston, Surrey. Sr. H.O. 56
Lancaster Royal Infy. Pre-reg. H.O. 57
Leeds R.H.B. Reg. 57
Leeds R.H.B. Regs. 57
Lincoln County. Pre-reg. H.O. .. 56
Liverpool United Hosps. Reg. .. 57
Maidenhead. Pre-reg. H.O. 57
Maidenhead. Reg. 57
Maidstone. West Kent Gen. Pre-reg. H.O. 57
Manchester. Withington. Pre-reg. H.O. 58
Mexborough. Montagu. H.O. .. 58
Middlesbrough. North Ormesby. H.O. 58
Newcastle United Hosps. Reg. & Sr. H.O. 58/59
North East Met. R.H.B. Reg. .. 51
Northwood. Mount Vernon. H.O. .. 59
Nottingham City. H.O. 59
Nottingham Gen. Pre-reg. H.O.'s .. 59
Oxford United Hosps. Reg. 59
Paisley. Royal Alexandra Infy. H.O.'s 59
Peterborough. Memorial. H.O. .. 60
Portsmouth Group H.M.C. Pre-reg. H.O.'s 60
Richmond, Surrey. Royal. Sr. H.O. 60
Romford. Oldchurch. H.O. 60
Rotherham Hosp. & Moorgate Gen. H.O. 60
Rotherham Hosp. & Rosehill Hosp. Annexe. H.O. 60
Ryde. Royal I.W. County. H.O. or Sr. H.O. 60
Salisbury Gen. H.O. 60
Scotland. South-Eastern R.H.B. Reg. 61
Shoreham - by - Sea. Southlands. Locum Reg. 60
Shrewsbury. Royal Salop Infy. Copthorne. H.O. 60
Slough. Upton. Locum Sr. Reg. .. 61
Southampton. Royal South Hants. H.O. 61
St. Albans City. H.O. 61
Stockport Infy. Sr. H.O. 61
Stoke-on-Trent. North Staffs Royal Infy. H.O.'s 61
Stoke-on-Trent. North Staffs Royal Infy. Sr. H.O. 61
Stratford-on-Avon. H.O. 62
Taunton & Somerset. Pre-reg. H.O. .. 62
Torquay. Torbay. H.O. 62
Watford. Peace Memorial. H.O. .. 62
Welsh R.H.B. Reg. 62
Weston-super-Mare Gen. Pre-reg. H.O. 62
Winchester. Royal Hants County. H.O.'s 62
Windsor. King Edward VII. Pre-reg. H.O. 62
Wolverhampton. Royal. Pre-reg. H.O.'s 63
Wrexham. Maelor Gen. Pre-reg. H.O.'s 63
Wrexham. War Mem. Pre-reg. H.O.'s 63
Ibadan, Nigeria. University College Hosp. Reg. 63

THORACIC SURGERY
Aberdeen Gen. Hosps. B.O.M. H.O.'s 52
Bristol. Cossham & Frenchay H.M.C. Sr. H.O. 54
Leeds United Hosps. Reg. 57
Manchester R.H.B. Reg. 58
Sully, Glam. Sr. H.O. 61

UROLOGY
Leeds United Hosps. Regs. 57
Sunderland Royal Infy. H.O. or Sr. H.O. 61

GENERAL
Canada. Holy Cross, Calgary. Jr. Interns 63
U.S.A. St. Elizabeth Hosp., Covington. Internes 63

PUBLIC APPOINTMENTS 63
GENERAL PRACTICE 64
NON-MEDICAL 64
MISCELLANEOUS 64

The terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

ANÆSTHETICS COURSE

A 2 weeks' COURSE OF LECTURES, DEMONSTRATIONS AND TUTORIALS for postgraduates preparing for higher diplomas in anæsthetics will be held from 10TH TO 21ST FEBRUARY, 1958.

Fees: Lectures and Demonstrations £15 15s.
Tutorial Discussion Groups £10 10s.

Further details and application forms may be obtained from Mr. W. F. DAVIS, Secretary, Faculty of Anæsthetists, Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2 (Tel. HOLborn 3474, ext. 23).

UNIVERSITY OF LONDON
FACULTY OF MEDICINE

DEGREE OF DOCTOR OF MEDICINE (M.D.)

An important change in the regulations for the degree of Doctor of Medicine (M.D.) in the University of London will take effect from 1st October, 1958. After that date the degree of M.D. may be obtained by the presentation of a thesis dealing with general medicine or with some special branch of medicine (including pathology) not less than 7 years after full registration with the General Medical Council. Nevertheless, a candidate who has held an approved appointment in an approved hospital for not less than 1 year may be allowed to submit his entry for the M.D. degree not less than 4 years after full registration with the General Medical Council.

The Part I Examination under present regulations will be held for the last time in July, 1958. A candidate who has passed or obtained exemption from the Part I Examination will be allowed to present his thesis not less than 4 years after full registration with the General Medical Council.

A candidate for admission to the M.D. degree must have obtained the M.B., B.S. degrees of this University.

Copies of the revised M.D. regulations may be obtained from the undersigned. JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF LONDON

POSTGRADUATE AWARDS FOR MEDICAL AND SCIENTIFIC RESEARCH

Applications are invited from graduates of the University of London for the following awards for full-time research:—

J. F. H. Knight Postgraduate Fellowship: value £1000 a year for 2 academic sessions, for research into the social, epidemiological or preventive aspects of diseases of adult life.

Williams Fellowship for Medical and Scientific Research: value £1500 a year for 2 academic sessions, for original research into the cause and cure of diseases and illnesses attacking or affecting human beings.

Forms and further particulars from the Secretary to the Scholarships Committee, Senate House, London, W.C.1, to whom applications must be returned not later than 15th February, 1958.

UNIVERSITY COLLEGE LONDON

FREE PUBLIC LECTURES, SPRING TERM 1958

THURSDAY, 23RD JANUARY, at 5 P.M. Dr. E. LESTER SMITH: The Biochemical Functions of Vitamin B.

THURSDAY, 13TH, 20TH, 27TH FEBRUARY, at 5 P.M. Dr. F. H. C. CRICK: The Nucleic Acids.

TUESDAY, 18TH, 25TH FEBRUARY, at 5.15 P.M. Dr. C. A. G. WIERSMA: (1) Comparative Physiology of Crustacean Neuromuscular Systems; (2) Integration in Single Units of the Crayfish Central Nervous System.

MONDAY, 10TH, 17TH MARCH, at 5 P.M. Dr. J. D. JUDAH: Oxidative Phosphorylation.

Details of all public lectures (including lunch-hour lectures) from Publications Officer, University College London, Gower-street, W.C.1. (Stamped envelope required.)

THE LONDON HOSPITAL MEDICAL COLLEGE

COURSE IN ADVANCED SURGERY

An EVENING POSTGRADUATE COURSE IN SURGERY for the Final Examination of the F.R.C.S. will be held at The London Hospital from MONDAY, 10TH MARCH, to MONDAY, 28TH APRIL.

The Course will be held on Monday and Wednesday evenings from 6.30 P.M. to 8.30 P.M. with the exception of Monday, 7th April, and will be limited to 18 students.

The fee for the Course will be £12. An entrance fee of £5 5s. must be paid by non-London Hospital graduates.

Applications should be made to The Dean, H. B. MAY, M.D., F.R.C.P., The London Hospital Medical College, Turner-street, E.1.

POSTGRADUATE LECTURES AT ST. MARK'S HOSPITAL
(in association with the British Postgraduate Medical Federation)

During MARCH, 1958, a series of 5 LECTURE-DEMONSTRATIONS will be given at St. Mark's Hospital on Saturday mornings from 9.30 to 12. These are intended as a revision course in surgical diseases of the rectum and colon for postgraduate students working for the F.R.C.S.

Date 1958	*Subjects*
1st March ..	The Anatomy and Physiology of the Rectum and Colon, Hæmorrhoids, Fissure and Fistula.
8th " ..	Cancer of the Rectum and Anus.
15th " ..	Cancer of the Colon: Polyps and Polyposis.
22nd " ..	Ulcerative Colitis.
29th " ..	Diverticulitis: Rectal Prolapse.

At least 2 of the members of the staff of St. Mark's Hospital will be present on each occasion to take part in the teaching.

Not more than 20 students will be accepted.

The fee for the whole 5-week course will be 5 guineas.

Application for admission should be made to the Dean, Dr. CUTHBERT DUKES, at St. Mark's Hospital, City-road, London, E.C.1.

THE NUFFIELD FOUNDATION

DENTAL FELLOWSHIPS AND SCHOLARSHIPS

The Nuffield Foundation invites applications, from citizens of the United Kingdom, for Fellowships and Scholarships in Dentistry. To help the advancement of teaching and research in the United Kingdom on dental health and disease, the Foundation is prepared to award a number of Fellowships:

(i) to enable selected men and women with dental qualifications to receive such additional training in pure and applied science as is desirable to fit them for an academic career in dentistry (but not to obtain a medical qualification), and

(ii) to enable selected university graduates in medicine and science to receive training that will qualify them to undertake teaching and fundamental research on dental health and disease.

The Foundation is also prepared to award a limited number of Scholarships to assist students of outstanding ability attending a university dental school to devote 1 or 2 years to further studies of the basic sciences.

All applications must first be endorsed by the executive authority of the appropriate dental or medical school or scientific faculty of a university in the United Kingdom. They must be received by the Foundation by 1st March in the case of Fellowships which are awarded once a year; and by 31st January and 30th June in the case of scholarships which are awarded twice a year. Copies of the conditions of both Fellowships and Scholarships and the application forms are obtainable from the Director, The Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.

L. FARRER-BROWN, Director of the Nuffield Foundation.

INSTITUTE OF ORTHOPÆDICS

PROVISIONAL PROGRAMME

A COURSE OF LECTURES on "Disorders of the Spine" will be given in the Lecture Room at the Institute of Orthopædics, Royal National Orthopædic Hospital, 234, Great Portland-street, London, W.1, on FRIDAYS at 6 P.M. on the following dates:—

17th Jan.	Scoliosis I	Mr. J. I. P. JAMES
31st Jan.	Scoliosis II	Mr. J. I. P. JAMES
7th Feb.	Spondylolisthesis	Mr. P. H. NEWMAN
14th Feb.	Ankylosing Spondylitis	Mr. D. TREVOR
21st Feb.	Infections of the Spine other than Tuberculosis	Mr. C. W. MANNING
28th Feb.	Disc Lesions	Mr. P. H. NEWMAN
7th March	Osteoporosis of the Spine	Dr. R. NASSIM
14th March	Tumours of the Spine	Mr. H. J. BURROWS
21st March	Pott's Disease	Mr. J. A. CHOLMELEY
28th March	Pott's Paraplegia	Mr. H. J. SEDDON

The fee for the full course will be 3 guineas, or for a single lecture 7s. 6d.

Tickets may be obtained on application to the Dean, at 234, Great Portland-street.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

POSTGRADUATE ACADEMIC DIPLOMA IN BACTERIOLOGY

The COURSE for the Postgraduate Diploma in Bacteriology for the session 1958–59 will commence in October, 1958. This is a full-time day course extending over 1 academic year. Fee for the course £73 10s.

The course may be taken by:

(*a*) Graduates in medicine or veterinary science desiring to study bacteriology as applied to medicine and hygiene;

(*b*) Graduates in science with a first- or second-class honours degree in chemistry, or its equivalent. For such students, the course covers the fields of general bacteriology, chemical microbiology and industrial microbiology.

Applications for admission to the Diploma course must be received not later than 1st March, 1958.

Further information and application forms can be obtained from the Registrar, London School of Hygiene and Tropical Medicine, Keppel-street, W.C.1.

THE ROYAL EYE HOSPITAL,
St. George's-circus, S.E.1

Students are requested to note that the Refraction Lecture by Dr. WHITTINGTON, originally arranged for 16TH JANUARY, 1958, will now be held on WEDNESDAY, 15TH JANUARY, 1958.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY

A REFRESHER COURSE suitable for general practitioners will be held from MONDAY, 24TH FEBRUARY, to SATURDAY, 1ST MARCH, 1958, with attendance at Queen Charlotte's Hospital, Chelsea Hospital for Women and the Department of Obstetrics and Gynæcology at Hammersmith Hospital. The fee for the course is £5 5s. Limited hostel accommodation is available.

Apply Secretary, Institute of Obstetrics and Gynæcology, Chelsea Hospital for Women, Dovehouse-street, London, S.W.3.

L.M.S.S.A.

FINAL EXAMINATION: MEDICINE, 10th February, 10th March, 14th April, 1958. SURGERY, 10th February, 10th March, 14th April, 1958. MIDWIFERY, 11th February, 11th March, 15th April, 1958. PATHOLOGY, 11th February, 11th March, 15th April, 1958. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

THE ROYAL MARSDEN HOSPITAL AND INSTITUTE OF UROLOGY.

Applications are invited for a full-time RESEARCH FELLOWSHIP with the status and pay equal to Senior Registrar in the Radiological Departments of the above Institutions. Candidates should hold a diploma in radio-diagnosis and should be prepared to carry out research work in urology and in the diagnosis of malignant diseases. Exceptional facilities are available including image intensification and cineradiography.

Applications should be sent to the House Governor, Royal Marsden Hospital, S.W.3. The Departments may be visited by direct appointment.

UNIVERSITY OF BIRMINGHAM. Faculty of Medicine. DEPARTMENT OF SOCIAL MEDICINE. Applications are invited from Medical graduates for the post of LECTURER IN SOCIAL MEDICINE (Clinical). Salary according to qualifications and experience in the range £900–£1950 p.a.

Applications (6 copies), together with the names of 3 referees, should be sent not later than 15th February, 1958, to the Assistant Registrar, The Medical School, Birmingham, 15, from whom further particulars may be obtained.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LECTURER or SENIOR LECTURER in the Department of Tropical Hygiene in the School of Tropical Medicine, at an initial salary within the range £1200–£2000 p.a. for a Lecturer and £1800–£2000 p.a. for a Senior Lecturer, according to qualifications and experience.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 31st March, 1958, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

THE UNIVERSITY OF LEEDS. Applications are invited for IMPERIAL CHEMICAL INDUSTRIES LIMITED RESEARCH FELLOWSHIPS in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemotherapy, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Chemistry of High Polymers (keratin and man-made fibres), Textile Technology and Textile Engineering). The Fellowships will be of an annual value within the range £700–£1000 a year according to qualifications and experience, and will normally be tenable for 3 years. Further particulars can be obtained on request.

Applications (3 copies) (1 in the case of applicants from overseas), together with the names of 2 referees, should reach the Registrar, The University, Leeds, 2, not later than 12th April, 1958.

Hospital Services: Senior Appointments

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, N.W.8. Applications are invited for the post of HONORARY ASSISTANT OBSTETRICIAN AND GYNÆCOLOGIST to the above Hospital. Wide experience and higher qualifications are essential.

Applications (30 copies) should be sent to the undersigned on or before Monday, 10th February, 1958. Testimonials are not required but the names of 3 persons willing to act as referees should be furnished. Sister MARY CLARE, Secretary,
Hospital of St. John and St. Elizabeth.
60, Grove End-road, London, N.W.8.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. ASSISTANT PSYCHIATRIST, Whole-time, Senior Hospital Medical Officer grade, Hill End Hospital, St. Albans. (760 Beds.) Encouragement given to research. Accommodation available for single candidate.

Applications before 11th February, 1958.

2. CONSULTANT PHYSICIAN in Physical Medicine, 2 half-days a week, Acton Hospital, Gunnersbury-lane, W.3. (84 Beds.)

Applications before 17th February, 1958.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ST. THOMAS'S HOSPITAL, London, S.E.1. Physician to the Prædiatric Department. Consultant status, with membership of the Medical Committee. 4 sessions per week. Vacant 13th October, 1958.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 14th February, 1958.

ST. THOMAS'S HOSPITAL, London, S.E.1. Anæsthetist. Consultant status, with membership of the Medical Committee. 6 sessions per week. Vacant 12th November, 1958.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 14th February, 1958.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ASSISTANT RADIOTHERAPIST required for whole-time duties at Addenbrooke's Hospital to take part in the work of the Radiotherapeutic Centre under the control of the Director and the other Consultant Radiotherapists. Salary on the Senior Hospital Medical Officer scale.

Applications (12 copies), stating age, nationality, qualifications, and details of present and past appointments, with names of 3 referees, to Secretary, United Cambridge Hospitals, Addenbrooke's Hospital, Cambridge, by 8th February.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of Locum CONSULTANT RADIODIAGNOSTICIAN based on Essex County Hospital, Colchester, for the period 28th June–17th August, 1958.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited from medical practitioners for the appointment of REGIONAL PSYCHIATRIST (salary scale £2300–£115(5)–£2875). The person appointed will be engaged wholly on administrative duties on the staff of the Senior Administrative Medical Officer and will be concerned primarily with the Mental Health Services in the Region. Candidates should hold a higher medical qualification and preferably the D.P.M. They should have wide experience in general psychiatry, mental hospital administration and/or community health.

Applications (12 copies), with full details of qualifications and experience, together with the names and addresses of 3 referees, to the Secretary, Park Parade, Harrogate, by 31st January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications are invited from duly qualified medical practitioners for the whole-time post of DEPUTY SENIOR ADMINISTRATIVE MEDICAL OFFICER at a salary of £1900–£100(5)–£2400 p.a. subject to National Health Service (superannuation) regulations. Experience in hospital administration essential; D.P.H. an advantage. Duties: to assist the Senior Administrative Medical Officer in the planning, organisation and staffing of the hospital and specialist services of the region and such administrative and executive functions as may be assigned to him.

Applications (15 copies), stating qualifications and experience, together with the names of 3 referees, should be addressed to the Secretary of the Board (from whom further particulars of the post may be obtained) at 10, Augustus-road, Edgbaston, Birmingham, 15, by 25th January, 1958. Canvassing will disqualify.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PHYSICIAN (geriatrics) responsible for organisation and control of geriatric services covering the areas of Coventry, Nuneaton, and Rugby. Wide experience and higher qualification essential.

Applications (15 copies), stating name, age, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 10th February, 1958.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for appointment of CONSULTANT PÆDIATRICIAN of junior status for duty initially at the Royal Liverpool Children's Hospital. The appointment is for 3 notional half-days a week and the duties are mainly in cardiology. Candidates must possess a registrable qualification and F.R.C.P. or M.R.C.P. (London, Edinburgh or Ireland).

Detailed applications, giving full particulars of age, qualifications, &c., present and previous appointments, and the names of 3 referees, should reach the Secretary, 80, Rodney-street, Liverpool, 1, by 25th January, 1958.

NEWCASTLE REGIONAL HOSPITAL BOARD. ConSULTANT ANÆSTHETIST, whole-time or maximum part-time, for Sunderland Group of hospitals (358,000 population). Main hospitals: Sunderland General (470 Beds), Royal Infirmary (300 Beds), Ryhope General (280 Beds), Sunderland Orthopædic and Accident (120 Beds).

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. ConSULTANT GENERAL PHYSICIAN, whole-time or maximum part-time, for the South West Durham (106,000 population) and Durham (132,000 population) Groups of hospitals, for approximately 6 or 5 and 5 or 4 sessions per week respectively. Main hospitals: Bishop Auckland General (365 Beds), Dryburn (300 Beds), Chester le Street General (200 Beds); to reside near Bishop Auckland.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum CONSULTANT PHYSICIAN (geriatrics), 9 notional half-days per week, Tees-side Group of hospitals; approximately 3 months. Accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST for 9 notional half-days per week for Tees-side Group of hospitals for at least 1 month from end of January, 1958.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD requires a whole-time CONSULTANT BACTERIOLOGIST to take charge of the Laboratory at the City Hospital, Aberdeen. The Laboratory undertakes Public Health work and Hospital work and the examination of specimens referred by general practitioners from the whole of the north-eastern area of Scotland.

Applications, together with the names of 2 referees, should be forwarded by 1st February, 1958, to the Senior Administrative Medical Officer, 1, Albyn-place, Aberdeen, from whom further particulars and a form of application may be obtained.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PATHOLOGIST required for the Boston Group of hospitals.

Application forms and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 3rd February, 1958.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT TRAUMATIC AND ORTHOPÆDIC SURGEON required West Wales Hospital Management Committee area immediately for approximately 2–3 months.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

Hospital Services: Junior Appointments

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. SEAMEN'S HOSPITALS GROUP. SENIOR HOUSE OFFICER for Receiving Room duties required 3rd February. Post, which is normally resident, is recognised by the Royal College of Surgeons, and provides excellent experience in a wide variety of traumatic conditions received from the adjacent dockland and from shipping in the Port of London. Salary £819 10s.

Applications, stating age, nationality, qualifications, and experience, with the names of 2 recent referees, should be sent to the Secretary, Dreadnought Seamen's Hospital, Greenwich, S.E.10, not later than 18th January.

ACTON HOSPITAL, Gunnersbury-lane, Acton, W.3. SENIOR HOUSE OFFICER (resident) required as Casualty Officer from 7th January, 1958. Ministry of Health conditions of service.

Applications, with copies of 2 testimonials, to Hospital Secretary within 7 days.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER (pre-registration) required in Orthopædic and Traumatic Department. Post vacant 22nd February.

Applications, with 2 testimonials, to Medical Director by 18th February.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST, graded Senior House Officer. Post vacant 16th February, 1958. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c. Recognised for D.A. and F.F.A. R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (general surgery) required as soon as possible.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 20th January.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON required 50 surgical beds, new operating theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications are invited for a full-time post of RESIDENT SENIOR GYNÆCOLOGICAL HOUSE OFFICER, vacant on 1st April, 1958. Appointment is for 6 months but the holder can apply for an extension of 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction of £150 p.a. for residential emoluments. The appointment is recognised for the M.R.C.O.G. examination.

Applications, stating age, nationality, qualifications and experience, supported by the names and addresses of 2 referees, must reach the undersigned not later than Wednesday, 15th January. D. C. EMERY, Secretary.

LONDON CHEST HOSPITAL (Country Branch), HOSPITALS FOR DISEASES OF THE CHEST. REGISTRAR in Clinical Pathology (Registrar grade). A vacancy occurs at the country branch near Letchworth. The appointment is a whole-time one and will be for 1 year in the first instance and the holder may be resident or non-resident.

Applications, stating age, qualifications with dates, and previous experience, together with copies of 3 testimonials, should reach the undersigned not later than 22nd January, 1958. G. BRATT, Acting House Governor.

London Chest Hospital, E.2.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Accident and Orthopædic Department, becoming vacant in February, 1958. A higher qualification, although desirable, is not essential, but experience in general surgery is necessary.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 22nd January, 1958. H. BRIERLEY, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR REGISTRAR to the Department of Neurosurgery becoming vacant on 1st March. Candidates must be Fellows of the Royal College of Surgeons and previous experience of neurosurgery is essential.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 5th February, 1958. H. BRIERLEY, House Governor.

METROPOLITAN E.N.T. HOSPITAL AT ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. Applications are invited for appointment as CLINICAL ASSISTANTS for the following E.N.T. outpatient sessions. Posts tenable for 1 year. Salary £183 15s. p.a. per session.

Tuesday morning, Mr. F. Boyes Korkis.
Wednesday morning, Mr. Clifford Evans.
Thursday morning, Mr. C. P. Malley.
Thursday afternoon, Mr. F. Boyes Korkis.
Friday afternoon, Mr. Eric Steeler.

The present holders of the posts are being invited to re-apply.

Applications to the Hospital Secretary by 18th January, 1958. (L.121.)

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE SURGEON (post recognised for F.R.C.S.), vacant on 31st January, 1958. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

MIDDLESEX HOSPITAL, W.1, and NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for post of SENIOR REGISTRAR in the Department of Radiotherapy at The Middlesex Hospital, W.1. Appointment until 31st December, 1958, renewable. If so required, part of the total tenure of the appointment will be in the Radiotherapy Department at Mount Vernon Hospital, Northwood, under the control of the North West Metropolitan Regional Hospital Board.

Forms of application obtainable from the Deputy Superintendent, The Middlesex Hospital, and should be returned, naming 2 referees, by 1st February.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of REGISTRAR in the Department of Radiotherapy.

Forms of application obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 1st February.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, Hampstead, N.W.3. HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (Senior House Officer grade) required immediately.

Applications, with copies of testimonials, to the Administrative Officer by the 14th January, 1958.

MILE END HOSPITAL, Bancroft-road, London, E.1. (484 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant 6th February, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 17th January, 1958, with copies of not more than 3 testimonials.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. (General Hospital of 158 Beds.) Applications are invited to fill the undermentioned posts :—

HOUSE PHYSICIAN (general), pre-registration post. Vacant 13th February, 1958.

2 HOUSE SURGEONS (general), pre-registration posts. 1 vacant 5th February, 1958. 1 vacant 5th March, 1958.

Applications by post-registration candidates will also be considered.

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, to be forwarded to Hospital Secretary by 15th January, 1958.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

REGISTRAR in Obstetrics (resident), The Mothers' Hospital (Salvation Army), Lower Clapton-road, E.5. Recognised for M.R.C.O.G.

SURGICAL REGISTRAR (resident or non-resident near hospital), St. Andrew's Hospital, Billericay, Essex. Recognised for F.R.C.S.

PSYCHIATRIC REGISTRAR (resident or non-resident), St. Clement's Hospital, Bow-road, E.3. The Psychiatric Unit of 24 observation and 36 neuroses and early psychoses beds is run in conjunction with The London and Claybury Hospitals. Recognised for D.P.M.

ANÆSTHETIC REGISTRAR (resident or non-resident, sleeping in on duty nights), Hackney Hospital, Homerton High-street, E.9. Recognised for F.F.A. R.C.S. and D.A.

ANÆSTHETIC REGISTRAR (resident or non-resident), St. Andrew's Hospital, Billericay, Essex. Recognised for F.F.A. R.C.S.

ANÆSTHETIC REGISTRAR (resident), Tilbury and Riverside General Hospital, Tilbury, Essex. Recognised for F.F.A. R.C.S.

PÆDIATRIC REGISTRAR (non-resident), General Hospital, Southend-on-Sea, Essex. Previous pædiatric experience essential, M.R.C.P., and/or D.C.H. preferred.

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland-place, W.1, to be returned by 25th January, 1958.

NORTH MIDDLESEX HOSPITAL, London, N.18. CASUALTY OFFICER (Senior House Officer grade). 6-month appointment, starting 5th February, 1958. Non-resident post. Recognised for F.R.C.S. 3 Casualty Officers employed; duties include service with the 3 main surgical units.

Applications, stating age, qualifications, experience, together with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary, by 15th January, 1958.

NORTH MIDDLESEX HOSPITAL, London, N.18. Locum REGISTRAR in Surgery required from 31st January for approximately 1 month. Candidates should hold higher qualification in surgery and must have had considerable experience in emergency surgery. Further details on request.

Applications, with full particulars and copies of testimonials or names of 2 referees, to Hospital Secretary.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. (582 Beds.) Applications are invited for the post of REGISTRAR (surgical), whole-time, non-resident. Experience includes general ward and outpatient work, and the supervision and teaching of medical students from St. Mary's Hospital Medical School. The Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Secretary to the Committee, Paddington Group Hospital Management Committee, Harrow-road, W.9, by 27th January, 1958.

ROYAL FREE HOSPITAL. Applications are invited for 3 ASSISTANTS in the Department of Pathology. The successful candidates will be required to work under the direction of the Professor of Pathology and assist in the routine work in morbid anatomy, and also assist in a research project, either on liver or ischæmic heart disease. The appointment will be made for 1 year in the first instance, commencing 1st April, 1958, and preference will be given to candidates with a postgraduate degree and previous experience in pathology; these latter 2 qualifications are not essential, and the appointment can be considered as a training post. Salary will be £935 p.a. and will carry superannuation.

Applications should be sent to the Professor of Pathology, Royal Free Hospital, Gray's Inn-road, London, W.C.1, with the names of 2 referees, before 1st March, 1958.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. (270 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR (resident) required at above Hospital. Experience in practical operative surgery an advantage. Recognised post for F.R.C.S. Candidates may visit the hospital by direct appointment.

Application forms obtainable from and returnable to the Secretary, Royal Northern Hospital, N.7, by 21st January, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, STRATFORD, E.15. HOUSE PHYSICIAN (third post) for 6 months commencing 18th February, 1958.

Applications, with the names of 2 referees, to Hospital Secretary by 25th January, 1958.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2, Shadwell, E.1, BANSTEAD, SURREY. HOUSE OFFICER appointment for 2 consecutive periods of 6 months, commencing 1st March, 1958, first period House Physician, Shadwell, second period House Surgeon, Banstead, and Casualty Officer, Hackney-road.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned with copies of not more than 3 testimonials, not later than 17th January, 1958.

SOUTH LODGE HOSPITAL, World's End-lane, N.21. RESIDENT SENIOR HOUSE OFFICER required. Infectious diseases, non-tubercular diseases of the chest and other general duties. Vacant now.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, Enfield, Middlesex.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered Women practitioners for the post of Part-time NON-RESIDENT CASUALTY OFFICER (Senior House Officer grade) to attend every morning. The appointment is for a period of 6 months commencing at the end of March, 1958.

Forms of application from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON. Vacant 23rd March, 1958. Recognised for the M.R.C.O.G.

Application forms from Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Locum Part-time PÆDIATRIC AND MEDICAL REGISTRAR (Female) required for 7 sessions per week. 3 months—April–June, 1958.

Forms of application from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered Women medical practitioners for the post of ANÆSTHETIC REGISTRAR (either resident or prepared to live within 20 minutes of the Hospital). D.A. desirable but not essential. Post recognised for D.A. The appointment is normally for 2 years, but subject to review at the end of 1 year. Vacant now. Canvassing will disqualify but candidates may visit the Hospital by arrangement.

Forms of application from the Group Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to be returned by 25th January, 1958.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered medical Women for the post of SENIOR HOUSE OFFICER in Pathology. Vacant 24th March, 1958. Previous experience in laboratory work is not essential. Applicants will be required to live near the Hospital.

For forms of application apply to the Secretary.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. Applications are invited from Women candidates for the post of HOUSE SURGEON (pre-registration) at the above Hospital. Vacant 1st February, 1958. Duties include general surgery and the successful candidate will also be required to relieve the House Surgeon at the Annie McCall Maternity Hospital.

Application forms from the Hospital Secretary to be returned as soon as possible.

ST. ANDREW'S HOSPITAL, Devons-road, Bow, E.3. HOUSE PHYSICIAN. Recognised pre-registration post.

Applications, with copy of at least 1 testimonial, should be sent to Hospital Secretary immediately.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of SENIOR HOUSE OFFICER in the Department of Radiotherapy. The post, which is tenable from 1st March, 1958, is suitable for candidates who wish to train in radiotherapy.

Applications, with the names of 2 referees, should be submitted to the undersigned as soon as possible and in any case not later than 25th January, 1958.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (576 Beds.) Applications are invited for the post, now vacant, of HOUSE SURGEON (general), pre-registration.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to Hospital Secretary.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Applications invited for appointment as SENIOR HOUSE OFFICER (general medical duties). Resident post.

Apply, giving age and details of qualifications and experience, with copy testimonials or names of 2 referees, to the Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, not later than 20th January, 1958.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Applications invited for appointment as SENIOR HOUSE OFFICER (anæsthetics). Post vacant 1st February; recognised for F.F.A.R.C.S. and D.A.

Apply, showing age, qualifications and previous posts with names of 2 referees, to Group Secretary, Camberwell, Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, by 20th January, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Registrar (whole-time) required to the Allergy Clinics (Wright Fleming Institute of Microbiology). The appointment is for a first period of 12 months with effect from 4th March, 1958; remuneration to be at "Registrar" rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 28th January, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. 2 Casualty SURGEONS (non-resident) required for a first period of 6 months with effect from 1st March, 1958. Remuneration to be at "Senior House Officer" rates. Candidates must have held an appointment as House Surgeon at this Hospital or at another Hospital approved by the Board of Governors.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 28th January, 1958.

ST. MARY'S HOSPITAL CHILDREN'S DEPARTMENT, PRINCESS LOUISE KENSINGTON HOSPITAL FOR CHILDREN, St. Quintin-avenue, W.10. Applications are invited for the post of CLINICAL ASSISTANT, E.N.T. Department, graded General Practitioner, for 1 session per week, Mondays P.M. Outpatients only.

Applications, with names of 3 referees, should be sent to A. C. YOUNG, Esq., Secretary, not later than 25th January, 1958.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. Senior HOUSE OFFICER (general surgery and genito-urinary). Post recognised for F.R.C.S. Vacant 1st March.

Applications, stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 22nd January.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEON. Vacant January. Recognised for F.R.C.S. and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 8th April, 1958, for a RESIDENT DENTAL HOUSE SURGEON (Senior House Officer). The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in both oral surgery and orthodontics.

Full particulars and form of application, which must be returned not later than Monday, 3rd February, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on or about 18th April, 1958, for a SURGICAL OUTPATIENT ASSISTANT (Senior Registrar grade) for 1 session per week (Monday mornings).

Full particulars and form of application, which must be returned not later than Monday, 3rd February, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th April, 1958, for the following SENIOR HOUSE OFFICERS:

2 HOUSE PHYSICIANS.
1 HOUSE SURGEON.

Full particulars and form of application, which must be returned not later than Monday, 3rd February, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WESTMINSTER CHILDREN'S HOSPITAL. Westminster HOSPITAL TEACHING GROUP. CASUALTY OFFICER required for 6 months from 1st February, 1958. Grade 6 House Officer (post-registration) or Senior House Officer, dependent on experience. Pædiatric experience preferred.

Apply, with copies of 3 testimonials, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 15th January.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (No. 10) HOSPITAL GROUP. Applications are invited from fully registered medical practitioners for the post of HOUSE OFFICER in the Geriatric Unit at above Hospital. This post, vacant 14th January, 1958, offers excellent scope for persons interested in this specialty, as the most modern methods of Geriatric treatment are employed.

Application forms from the Hospital Secretary, to be returned by 20th January, 1958.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. Locum ANÆSTHETIC REGISTRAR required.

Apply to Hospital Secretary.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the following House Officer appointments for a period of 6 months from 1st February to 31st July, 1958. The appointments are approved as pre-registration service posts, and tenure for the subscribed period will count towards full registration on the Medical Register for provisionally registered practitioners.

Aberdeen Royal Infirmary

HOUSE SURGEON for Orthopædic Wards (resident).
HOUSE SURGEON for E.N.T. Department (resident).
HOUSE SURGEON (casualty) in the Outpatient Department (non-resident).

Woodend General Hospital

2 HOUSE SURGEONS for Thoracic Surgery Wards (resident).
HOUSE SURGEON for Orthopædic Wards (resident).

Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, with full details and giving the names of 2 referees, should be lodged immediately with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen.

ABERDEEN. ROYAL ABERDEEN HOSPITAL FOR SICK CHILDREN. HOUSE OFFICER (E.N.T.). The post, which is tenable for 6 months from 1st February, 1958, is recognised for pre-registration purposes but applications from registered practitioners will also be accepted.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be sent as soon as possible to the Group Medical Superintendent, Royal Aberdeen Hospital for Sick Children, Westburn-drive, Aberdeen.

ALTON GENERAL HOSPITAL, Alton. (136 Beds—acute general.) RESIDENT HOUSE SURGEON required for general surgical duties. Post suitable for pre-registration candidates. Vacant immediately. Recognised for F.R.C.S. 6-month appointment.

Applications and copies of testimonials to the Hospital Secretary.

ALTRINCHAM GENERAL HOSPITAL. Assistant Senior SURGICAL OFFICER (Junior Hospital Medical Officer grade). Applications are invited for this post in a hospital of 130 acute beds with a busy Casualty Department. The appointee would be required to exercise control of this Department and also to assist Resident Surgical Officer with the general surgical work of the hospital. The post offers excellent opportunities of practical experience and postgraduate study to suitably qualified candidates and particularly those studying for higher surgical qualifications.

Applications, with names of 2 referees, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland Road, Altrincham, Cheshire.

ALTRINCHAM GENERAL HOSPITAL. St. Anne's E.N.T. DEPARTMENT, ALTRINCHAM, CHESHIRE. (53 Beds.) REGISTRAR required (preferably resident). Vacant January, 1958. This post offers excellent opportunities of practical experience and is recognised under F.R.C.S. regulations.

Applications to be forwarded, with names of 2 referees, to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ASHFORD HOSPITAL, Ashford, Middlesex. (580 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON for general surgical duties. 6 months' appointment, preference given to pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

BANGOR. CAERNARVON AND ANGLESEY GENERAL HOSPITAL. Applications are invited for the post of HOUSE SURGEON at the above Hospital. (Recognised for the F.R.C.S.) The appointment is for a period of 6 months. Salary and conditions of service in accordance with those approved by the Ministry of Health.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to the Group Secretary, Caernarvon and Anglesey Hospital Management Committee, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of the appearance of this advertisement.

BANGOR. CAERNARVON AND ANGLESEY GENERAL HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN at the above Hospital. The appointment is for a period of 6 months. Salary and conditions of service in accordance with those approved by the Ministry of Health.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to the Group Secretary, Caernarvon and Anglesey Hospital Management Committee, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of the appearance of this advertisement.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration); vacant now. The Hospital serves a wide area of pleasant countryside and the post affords good opportunity to study excellent clinical material.

Apply to Group Secretary, 19, Alexandra-road, Barnstaple.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required in March.

Applications, naming 2 referees, to Group Secretary, 19, Alexandra-road, Barnstaple, N. Devon.

BATLEY. THE GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (recognised for F.R.C.S.) which will become vacant during January, 1958. The hospital is entirely surgical and deals with orthopædics, general surgery, ophthalmology and E.N.T. If required, married accommodation may be made available.

Detailed applications, including names of 2 referees, must be sent to Administrative Officer, The General Hospital, Carlinghow Hill, Batley.

BEDFORD GENERAL HOSPITAL. (436 Beds.) House SURGEON post vacant immediately. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units.

Applications, with copies of testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (436 Beds.) Resident pre-registration HOUSE PHYSICIAN required end January.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of REGISTRAR in Radiodiagnosis (non-resident), Registrar grade, for duties in the United Hospitals. The successful candidate should have passed Part I of the examination for the D.M.R.D.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him by 18th January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Obstetrics and Gynæcology, Dudley Road Hospital, Birmingham. Higher qualification an advantage. Must be resident. Successful applicant may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals, in accordance with arrangements for interchange of senior registrars agreed by the 2 Boards.

Application forms from Secretary, 10, Augustus-road, Birmingham, 15, to be returned by 27th January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. **Mid-Worcestershire Group, Birmingham-road, Bromsgrove**

REGISTRAR (obstetrics/gynæcology). Duties at Bromsgrove General Hospital (423 Beds) (7 notional half-days), and Dudley and Stourbridge Group (4 notional half-days).

2. **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury**

(*a*) REGISTRAR (obstetrics and gynæcology). Royal Salop Infirmary/Copthorne Hospital. Considerable clinical responsibility. House Surgeon posts (only) recognised for M.R.C.O.G.

(*b*) REGISTRAR (radiology—radiodiagnosis), Shrewsbury Group and Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry. Resident or non-resident.

3. **Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29**

REGISTRARS (orthopædic), Royal Orthopædic Hospital, Birmingham. 2 posts now vacant. 1 post resident ; 1 post unfurnished bungalow available at moderate rental. F.R.C.S. desirable—experience in orthopædic surgery.

4. **Coventry No. 20 Group, Coventry and Warwickshire Hospital, Coventry**

REGISTRAR (pathology) for general duties at Nuneaton Hospitals and the Group Laboratory. Recognised D.Path. Non-resident.

5. **Dudley, Stourbridge and District Hospital Group, The Guest Hospital, Dudley**

REGISTRAR, general surgery, at Corbett Hospital, Stourbridge (114 Beds). Experience specialty essential, higher qualifications desirable.

Application forms from Group Secretaries to be returned by 20th January, 1958.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at West Heath Hospital, Rednal-road, Birmingham, 31, vacant 1st January, 1958. (207 Beds for the treatment of tuberculous and non-tuberculous chest cases.) The successful applicant will reside at the above Hospital (accommodation for single person only), and will be offered facilities for undertaking duties at the Birmingham Chest Clinic, Great Charles-street, Birmingham, 3.

Applications, stating age, qualifications, training and experience, together with copies of 3 recent testimonials, should be addressed to the Group Secretary, Birmingham (Sanatoria) Group Hospital Management Committee, Yardley Green Hospital, Birmingham, 9.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. SENIOR HOUSE OFFICER AND HOUSE OFFICER, resident (including pre-registration), required. Vacant 1st February, 1958.

Applications, with copies of recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. ALL SAINTS' HOSPITAL. Senior HOUSE OFFICER (resident) required (Male or Female). The Hospital is associated with Birmingham University for teaching of psychiatry. Training for Diploma in Psychological Medicine provided.

Applications, stating age, qualifications, to the Medical Superintendent.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (775 Beds.) 2 HOUSE SURGEONS (general surgery). Recognised for pre-registration and F.R.C.S. Vacant now. Each appointment is in a unit of approximately 85 adult and children's general surgical beds under control of 2 Consultant Surgeons.

Applications marked House Surgeon to the Group Secretary, enclosing copies of 2 recent testimonials.

BIRMINGHAM (near). MARSTON GREEN MATER-NITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics) required. Post vacant 1st March, 1958. 121 obstetric and 10 gynæcological beds. Recognised for diploma and obstetrics part of M.R.C.O.G. Premature baby unit. Hospital affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to the Group Secretary, Dudley Road Hospital, Birmingham, 18.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the immediate appointment of SENIOR HOUSE OFFICER (resident), for E.N.T. duties. The appointment is recognised for the D.L.O. diploma and facilities are provided for studying.

Applications to the Hospital Secretary, Royal Victoria Hospital, Shelley-road, Bournemouth.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON. The post which becomes vacant on 30th January, 1958, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Application to the Hospital Secretary.

BLACKBURN. ROYAL INFIRMARY. (262 general beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER (casualty and orthopædics) required immediately. Junior Hospital Medical Officer post can be for any period up to 4 years. Recognised for F.R.C.S.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required immediately for established Geriatric Department under control of Consultant Geriatrician. There are 360 geriatric beds at Queen's Park Hospital, Blackburn, Springfield Hospital, Blackburn, and Clitheroe Hospital, Clitheroe. Accommodation for married man may be available if required.

Applications, with names and addresses of 2 referees, to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Royal Infirmary, Blackburn

HOUSE SURGEONS (2) required for 25th January and 1st February, 1958. Posts recognised for F.R.C.S. and approved for pre-registration purposes.

Queen's Park Hospital, Blackburn

HOUSE SURGEON required for 1st February, 1958. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BISHOP AUCKLAND, Co. DURHAM. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment. Accommodation available for married officer with no children.

Apply, naming 2 referees, to K. G. T. LUXFORD, Group Secretary, South West Durham Hospital Management Committee at the above address.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. (386 Beds.) SENIOR HOUSE OFFICER (surgical) required for general and orthopædic surgical duties. Salary £819 10s. p.a. less £150 in respect of resident emoluments. Appointment to commence 1st February, 1958.

Further particulars from, or applications with names of 2 referees to, the Hospital Secretary (Telephone: Bishop's Stortford 963).

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Bolton District General Hospital (607 Beds)

RESIDENT HOUSE SURGEONS (2). 1 vacant immediately and 1 on 8th February, tenable for 6 months and recognised under pre-registration service scheme. Also recognised for F.R.C.S.

The Royal Infirmary, Bolton (238 Beds)

RESIDENT HOUSE SURGEONS (3). Vacant 15th January, 16th January, and 1st February, tenable for 6 months and recognised under pre-registration service scheme. Also recognised for F.R.C.S.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BRADFORD CHILDREN'S HOSPITAL, Yorkshire. Senior HOUSE OFFICER (Male or Female), vacant 1st February, 1958. Recognised for D.C.H.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON to the Orthopædic Unit. Vacant 12th February, 1958. This post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, and experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required 22nd January. Duties include work in Orthopædic and Traumatic Unit. Recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars and naming two referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer), non-resident, required immediately, at the above Hospital. Recognised for F.R.C.S.

Applications as locum or for permanent post, stating usual particulars and the names of 2 referees, to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) HOUSE SURGEON (including gynæcology) required 1st February, 1958. Pre-registration and recognised for F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. SUSSEX EYE HOSPITAL. (58 Beds.) HOUSE SURGEON required 11th February, 1958. Recognised for F.R.C.S. and D.O. Successful candidate will be considered for senior post (Senior House Officer) on completion of 6 months.

Applications, stating age, qualifications and experience and naming 2 referees, to the Administrative Officer.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEONS (3). Applications are invited for 3 pre-registration posts in General Surgery which will be falling vacant during January and February, 1958. 2 of the posts are at Bury General Hospital and the third at Rossendale General Hospital.

Apply, stating age, qualifications and other details, to the Group Secretary at Bury General Hospital, Bury, Lancs.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.) Applications are invited for the following posts:

(*a*) HOUSE OFFICER (pre-registration) or SENIOR HOUSE OFFICER for Orthopædic and Casualty duties; recognised for F.R.C.S. (surgical). Vacant January. A Junior Hospital Medical Officer is also employed.

(*b*) Locum Tenens HOUSE SURGEONS (pre-registration) required for (i) Gynæcological and Obstetric duties and (ii) Orthopædic and Casualty duties for periods during the first 3 weeks of January.

Applications, with testimonials or names of 3 referees, to Hospital Secretary (Telephone: Bury St. Edmunds 2381).

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON (general—pre-registration) required at the above Hospital immediately. Post recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON (orthopædics), for work in Casualty Department, required immediately. Flat available for married officer without children.

Applications to Group Secretary as soon as possible.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER in the Regional Department of Thoracic Surgery (100 Beds) at Frenchay Hospital, Bristol. The work provides experience in all branches of cardiac, œsophageal and pulmonary surgery and the appointment is recognised for the Fellowship examinations of the Royal College of Surgeons.

Applications, stating age and experience, and naming 2 referees, to be submitted to the Group Secretary.

BRISTOL. STOKE PARK GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for an appointment as a JUNIOR HOSPITAL MEDICAL OFFICER in the above Group of mental deficiency hospitals (1868 Beds). A genuine interest in the problems of the mental defective is essential in these progressive hospitals pursuing an active programme of rehabilitation, and encouragement is given to take the D.P.M. Temporary unfurnished flat available. Salary £852 10s., rising by £55 to £1182 10s. p.a.

Applications, giving full personal particulars, qualifications and experience, together with names and addresses of 2 referees, to the Medical Superintendent, Stoke Park Hospital, Stapleton, Bristol, as soon as possible.

BUXTON. DEVONSHIRE ROYAL HOSPITAL. (252 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER, vacant now. This Hospital is a large special hospital for the treatment and rehabilitation of all types of locomotor disorders. Duties are mainly medical and include work in the long-stay unit of the Manchester University Rheumatism Research Centre. The Hospital is recognised under the regulations for the Diploma in Physical Medicine, Part II, and the post also offers good medical experience.

Applications, stating age, experience and qualifications, together with the names of 2 persons for reference, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, immediately.

CAERPHILLY HOSPITAL (general hospital, 228 Beds— 6 miles from Cardiff). HOUSE SURGEON. Post recognised for F.R.C.S. Married quarters.

Apply to Hospital Secretary.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ADDENBROOKE'S HOSPITAL, CAMBRIDGE. HOUSE SURGEON (in Orthopædic Department) for 6 months from mid-February. Recognised pre-registration service.

Apply to the Secretary immediately, stating age, nationality, qualifications and experience with dates, and with copies of 3 testimonials.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ADDENBROOKE'S HOSPITAL, CAMBRIDGE. REGISTRAR or SENIOR REGISTRAR in Physical Medicine, for 1 year in first instance, reviewable annually. Higher qualification desirable for senior post.

Apply, with full particulars and names of 3 referees, to Secretary by 25th January.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration or third post), which is recognised for the F.R.C.S., becomes vacant at the end of January, 1958. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., becomes vacant early in February, 1958. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A general children's hospital of 550 Beds.) RESIDENT MEDICAL REGISTRAR required to a firm comprising 180 Beds, including acute medical (60 Beds), poliomyelitis, rheumatism and long-stay wards and with certain medical administration duties.

Applications, on forms obtainable from the Group Secretary, should be returned by 31st January, 1958.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) SENIOR REGISTRAR in Pathology. Experience in bacteriology necessary, and in morbid anatomy desirable.

Application forms, returnable by 25th January, obtainable from the Group Secretary at above address.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (189 Beds)

Post of HOUSE PHYSICIAN.

Post of HOUSE SURGEON. Recognised for F.R.C.S.

First, second, third or pre-registration posts, tenable for 6 months.

Post of Locum MEDICAL REGISTRAR for period 1st–28th February, 1958.

Black Notley Hospital, Braintree, Essex (516 Beds)

Post of HOUSE PHYSICIAN. Includes duties in medical and pædiatric wards.

Post of HOUSE SURGEON. Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S.

First, second, third or pre-registration posts; tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR HOUSE OFFICER in General Surgery at the Cardiff Royal Infirmary. Non-resident post, vacant 1st March.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of REGISTRAR to the Orthopædic and Fracture Departments at the Cardiff Royal Infirmary. Non-resident post, vacant immediately.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of REGISTRAR in General Medicine at Llandough Hospital, Penarth, to commence duty 1st April.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Obstetrics and Gynæcology required. Appointment recognised for M.R.C.O.G.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD HOSPITAL MANAGEMENT COMMITTEE. Resident Locum MEDICAL REGISTRAR required for period 9th–22nd February.

Applications to Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford, Essex.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) HOUSE SURGEON required (pre- or post-registration). Vacant now. The post offers a wide experience in general surgery, gynæcology, and orthopædic surgery. Post recognised for the F.R.C.S.

Applications, with names of 2 referees, to be sent to Secretary, General Hospital, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for Gynæcological (30 Beds) and E.N.T. (approximately 14 Beds) Departments. Salary in accordance with terms and conditions of National Health Service. Post vacant 1st February, 1958.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHESTERFIELD ROYAL HOSPITAL, Chesterfield, DERBYSHIRE. (281 Beds.) HOUSE SURGEON required 20th January, in Senior House Officer or House Officer grade. Post recognised for F.R.C.S. purposes. If desired pre-registration appointment in medicine available after 6 months.

Please apply immediately to the Group Secretary, Chesterfield Hospital Management Committee, or phone Chesterfield 7271 for interview.

COLWYN BAY AND WEST DENBIGHSHIRE HOSPITAL. (60 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at the above Hospital. Self-contained furnished flat available.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, to be forwarded to the undersigned within 14 days from the date of publication of this advertisement. WILLIAM ROBERTS, Group Secretary,

Clwyd and Deeside Hospital Management Committee.

"Rhianfa", Russell-road, Rhyl.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) SENIOR HOUSE OFFICER (pædiatrics) required. Vacant 15th February, 1958. Recognised for D.C.H.

Applications, stating full particulars with 2 names for reference, to be sent as soon as possible to Hospital Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (neuro-surgery) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fullwood-road, Sheffield, by 20th January, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (417 Beds.) SENIOR HOUSE OFFICER (orthopædic). Vacant immediately. Recognised for 6 months' "unspecified" training for F.R.C.S.

Apply, giving full details and 2 names for reference, to Secretary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of HOUSE SURGEON (Intern or Senior House Officer). Post recognised for F.R.C.S.

Applications, stating age, &c., and enclosing copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL (247 Beds.) SENIOR HOUSE SURGEON. Vacant 20th January. Recognised for F.R.C.S. General surgery, some orthopædics. Good experience in emergency and general surgery, with time to read for a higher degree.

Detailed applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DORCHESTER. DORSET COUNTY HOSPITAL. (109 Beds.) HOUSE SURGEON required for resident, pre-registration post vacant mid-January and tenable for 6 months. Recognised for F.R.C.S. examinations.

Applications, stating age and qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

PÆDIATRIC REGISTRAR, Ipswich and East Suffolk Hospital. Recognised for D.C.H. Appointment for 1 year, renewable for second year. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital, Anglesea-road Wing, Ipswich.

REGISTRAR in Psychiatry, Suffolk Mental Hospitals. St. Clement's Hospital, Ipswich (430 Beds) and St. Audry's Hospital, Melton, near Woodbridge (1150 Beds) and associated general hospital outpatient clinics. There is a very active Out-patient Department and Electroencephalographic Department at St. Clement's Hospital. Both hospitals are recognised for the D.P.M. Candidates are invited to visit hospitals by direct arrangement with the Medical Superintendent, St. Audry's Hospital.

Applications, stating age, experience and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 27th January, 1958.

EAST GRINSTEAD. QUEEN VICTORIA HOSPITAL. RESIDENT HOUSE OFFICER (Male or Female) required immediately for General Hospital. Appointment for 6 months in first instance. Recognised for pre-registration purposes, and for F.R.C.S. examination.

Apply, stating age and experience, with names of 3 referees, to Hospital Secretary.

EBBW VALE HOSPITAL. (General beds 71, Maternity 15). Applications are invited for the following appointments:—

RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade).

SENIOR HOUSE OFFICER.

The Hospital is an active Surgical Unit and the Medical Staff consists of a Resident Consultant General Surgeon and visiting Orthopædic, Gynæcological and Ophthalmic Surgeons. The tenure of the appointment of the Junior House Medical Officer shall be for a period not exceeding 4 years and of the Senior House Officer for the period of 12 months.

Apply, giving full details and references, to Group Secretary, North Monmouthshire Hospital Management Committee, Nevill Hall Hospital, Abergavenny, Mon.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT HOUSE PHYSICIAN for Thoracic and Dermatological Departments. Duties to include "taking in of acute general medical cases". 6-month appointment. Post vacant 27th January, 1958.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 17th January, 1958.

EDINBURGH. CHALMERS HOSPITAL. Applications are invited from registered or pre-registration medical practitioners for the appointment of RESIDENT HOUSE SURGEON in the Gynæcological Annexe of the above Hospital, for 6 months commencing 1st April, 1958, entailing responsibility for 24 gynæcological beds and 19 children's surgical beds.

Applications, stating age, qualifications and experience and names of 2 referees, to be sent immediately to the Secretary, Edinburgh Central Hospitals, 1, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer grade) for duties in the Area Laboratory and at other hospitals in the Group. The Area Laboratory is recognised for the Diploma of Pathology and offers opportunity for training in all branches of pathology. Further information can be obtained from the Senior Pathologist. Appointment vacant on 1st March, 1958, and tenable for 1 year.

Applications, stating age, qualifications, experience, nationality, and the names of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, not later than 18th January, 1958.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (approved pre-registration post). Vacant 16th February, 1958. Duties with general surgical unit. Recognised by Royal College of Surgeons. 6 months' appointment.

Applications, with the names and addresses of 2 referees, to Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, by 18th January, 1958.

EPPING. ST. MARGARET'S HOSPITAL. Resident SENIOR HOUSE OFFICER (surgery). Post vacant early February. Recognised for F.R.C.S. Busy general hospital with easy access to London.

Applications, with copies of 2 testimonials, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain, Epping, Essex, by 22nd January, 1958.

GRAVESEND AND NORTH KENT HOSPITAL, Gravesend. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. Applications are invited for this resident post, vacant now; approved under pre-registration regulations and tenable for 6 months. Post offers experience also in obstetrics, gynæcology, and orthopædics. Salary £467 10s.–£577 10s. p.a., according to experience.

Applications to Hospital Secretary, giving details of experience, age, qualifications, and nationality.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL, Deneside, GREAT YARMOUTH. (134 Beds.) HOUSE PHYSICIAN required. House Officer or Senior House Officer status. Post recognised for pre-registration service. Membership of a Medical Defence Society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Hospital Secretary.

GLASGOW. ROYAL HOSPITAL FOR SICK CHILDREN, Yorkhill, Glasgow, C.3. There are vacancies for 2 HOUSE SURGEONS (pre-registration) at the above Hospital, for the term 1st February to 31st July, 1958.

Applications to Medical Superintendent.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Anæsthetics. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 18th January, 1958, to the Secretary and Treasurer, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLOUCESTER. HORTON ROAD AND CONEY HILL HOSPITALS. (1540 Beds.) Applications invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER. Hospitals serve the North Gloucestershire Clinical Area, including Gloucester, Cheltenham, Stroud and Forest of Dean. High admission rate (850). All modern methods of treatment. New units provided for treatment of neurosis and alcoholism. Expanding outpatient services, day-hospital, long stay annexes and social clubs. Encouragement and opportunity for study. Salary and conditions Whitley Council. Single accommodation available. Married accommodation a possibility.

Applications, with names of 3 referees, to Physician-Superintendent within 14 days.

GREENOCK. GATESIDE INFECTIOUS DISEASES HOSPITAL. BOARD OF MANAGEMENT FOR GREENOCK AND DISTRICT HOSPITALS. Applications are invited from suitably qualified medical practitioners for the appointments of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICERS. Good experience offered in the diagnosis and treatment of infectious diseases including venereal diseases. Well equipped clinical laboratory. The appointments will be subject to the National Health Service (Scotland) (superannuation) regulations.

Applications, giving details of age, experience, and qualifications, together with copies of 3 recent testimonials, or names of referees, should be forwarded to the Group Secretary and Treasurer, 47 Eldon-street, Greenock, within 14 days from date of insertion.

HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds.) HOUSE SURGEON required for gynæcological beds (32) in hospital for obstetric and gynæcological patients only. Appointment recognised for M.R.C.O.G. is vacant Monday, 24th February, 1958. Candidates for pre-registration service (surgery) can be considered.

Applications, giving names and addresses of 3 referees, to be sent to the Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. 2 HOUSE SURGEONS (pre-registration) required.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEREFORD. COUNTY HOSPITAL. (339 Beds.) House OFFICER (surgery) required. Hospital recognised for F.R.C.S. Post vacant 15th January, 1958.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general, gynæcology and obstetrics). First or second post. To commence as soon as possible. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of RESIDENT HOUSE PHYSICIAN (Male or Female), second post held. Recognised pre-registration post. 6 months' appointment. Preference given to applicants who have held resident surgical or medical posts in general hospital. Duties to commence mid-February, 1958.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (235 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital, to commence duties immediately. The Group Geriatric Admission Unit is based on this Hospital, which also caters for acute medical and surgical, pædiatric and maternity patients. Salary in accordance with the terms and conditions of service for hospital medical and dental staff, £852 10s.–£55–£1182 10s. p.a. House available for married candidate.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from provisionally registered medical practitioners for the post of HOUSE PHYSICIAN, to commence duties on 1st March, 1958. Salary in accordance with national scales.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty on 16th January, 1958. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scales.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is recognised under the Fellowship regulations and will be graded either Junior Hospital Medical Officer or Senior House Officer according to experience. Duties terminate at 7 P.M. with 1 night weekly on call.

Applications for the appointment, which will be vacant on 23rd January, 1958, should be accompanied by copies of 3 recent testimonials and addressed to the undersigned.

H. J. JOHNSON, Group Secretary.

The Royal Infirmary, Huddersfield.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of resident JUNIOR HOUSE PHYSICIAN (pre-registration post).

Applications, with 2 recent testimonials, to the Hospital Secretary.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. Pre-registration or registration post. HOUSE SURGEON required on 28th January, 1958. An interesting and varied post which includes outpatient and casualty work.

Applications, together with details of experience, testimonials, &c., to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (356 Beds.) Applications are invited for 2 posts of HOUSE SURGEON to Consultant General Surgeons, both vacant mid-January. The posts are recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

ILFORD. KING GEORGE HOSPITAL. (General Hospital —211 Beds). There will be a vacancy for a SENIOR HOUSE OFFICER, Orthopædic Department at above Hospital, on 20th January, 1958. Salary will be at the rate of £819 10s. p.a., less emoluments. Recognised for the F.R.C.S.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital
King George Hospital. Management Committee

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House SURGEON. Duties include plastic surgery and orthopædic surgery (58 orthopædic beds and 18 plastic surgery beds). Large outpatient clinics.

Applications, stating age, qualifications, nationality, and copies of up to 3 testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 20th January, 1958.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR, Pædiatric Department. Whole-time. Vacant 15th February 1958. Previous pædiatric experience essential. Duties include work in children's unit (90 Beds), neonatal unit and pædiatric outpatient clinics. Candidates may visit hospital by appointment with Medical Director.

Application forms obtainable from and returnable to Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 21st January.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident) required as House Surgeon and to assist Casualty Officer. Salary £819 10s. p.a.

Applications, with names of 2 referees, to Hospital Secretary, Royal Isle of Wight County Hospital, Ryde, not later than 17th January.

KENDAL. WESTMORLAND COUNTY HOSPITAL. (82 Beds.) RESIDENT SENIOR HOUSE OFFICER (medical). Duties include the care of acute cases under the supervision of 2 Consultant Physicians, and attendance at consultative clinics. Post vacant now, and tenable for 1 year.

Applications, with full particulars and names of 2 referees, to be addressed to Group Secretary, Royal Lancaster Infirmary, Lancaster.

KETTERING AND DISTRICT GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post, vacant now, offers wide experience of all traumatic conditions including fractures and some orthopædic cases with charge of 30 Beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-ON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of SENIOR HOUSE OFFICER (general surgery) which is available on 1st March, 1958. The post is recognised for F.R.C.S. purposes.

Applications, stating age, qualifications and experience, with 2 testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-ON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of SENIOR HOUSE OFFICER (orthopædic and casualty) which is available on 1st March, 1958. The post is recognised in casualty for F.R.C.S. purposes.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

LINCOLN COUNTY HOSPITAL, Sewell-road. (200 Beds.) Applications are invited from pre-registration candidates for appointment as HOUSE SURGEON for 6 months, commencing in February, 1958, to be followed, if satisfactory, by appointment as House Physician for a further 6 months. Full particulars should be sent to R. W. HOWICK, Group Secretary.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (surgical) (pre-registration post). Successful applicant will work with Consultant Surgical Unit and attend consultative clinics. Post tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS REGIONAL HOSPITAL BOARD. Senior Registrar in Psychiatry for duties at:—

(i) Storthes Hall Hospital, Kirkburton, near Huddersfield (2600 Beds), and associated clinics. Duties will also include visits to the neurological and E.E.G. unit at the General Infirmary at Leeds. Resident or non-resident.

(ii) De la Pole Hospital, Willerby, Hull (1000 Beds). This hospital has a high admission-rate and a separate neurosis unit for females. Duties also include visits to the psychiatric day centre, Hull, and an outpatient clinic at Goole. Small flat available for married person, otherwise non-resident.

Successful candidates for both appointments will undertake 2 clinical sessions (which may include research) in association with the Department of Psychiatry of the University of Leeds. Candidates for both these appointments should hold the D.P.M. or equivalent qualification.

Applications, stating age, qualifications and details of appointments held, showing dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, by 22nd January, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Leeds A and B Groups. Recognised for F.F.A.R.C.S. and D.A. Resident.

General Surgery

St. James's Hospital, Leeds (124 general surgical beds).

General/Plastic Surgery

St. Luke's Hospital, Bradford (150 general surgical and 20 plastic surgical beds). Preferably resident.

Obstetrics and Gynæcology

York A Group (80 obstetric and 75 gynæcological beds). Recognised for M.R.C.O.G.

Psychiatry

(i) Menston Hospital, near Leeds (2500 Beds). Residential accommodation can be provided for a single person.

(ii) Oulton Hall Hospital, near Wakefield, and affiliated Mental Deficiency Colonies (approximately 400 Beds). Non-resident.

(iii) Psychiatric Unit, St. James's Hospital, Leeds. Offers special opportunity for experience with neurotic and psychosomatic patients and the Unit works in close association with the Department of Psychiatry. Resident or non-resident.

(iv) Storthes Hall Hospital, Huddersfield (2750 Beds).

If desired, facilities for attendance at the Leeds University will be provided, if the successful candidates are studying for the D.P.M.

Rheumatism Research

The Leeds Regional Hospital Board in association with the University of Leeds invites applications for the post of Research Registrar in Rheumatism to assist the Professor of Clinical Medicine with research projects at the Royal Bath Hospital, Harrogate, which is the centre for the Regional Rheumatism Scheme, or elsewhere in the Region.

Applications, stating age, sex, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 15th January, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar in General Surgery, Victoria Hospital, Keighley (35 surgical beds). Recognised for F.R.C.S. May include some duties in the Casualty Department.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 17th January, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. REGISTRAR in Thoracic Surgery required, from 1st April, 1958, for 1 year in the first instance.

Applications, stating age, experience, qualifications, previous posts with dates, and 3 names for reference, to be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 18th January, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. 2 REGISTRARS in Urology required, 1 for general urological duties, vacant 1st April, 1958, the other with special reference to work in connection with the artificial kidney, vacant now.

Applications, stating age, experience, qualifications, previous posts with dates, and 3 names for reference, stating also preference of post, to be sent to the Sub-Dean, The School of Medicine, Leeds, 2, by not later than 18th January, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. SENIOR HOUSE OFFICER in E.N.T. Department required for a period of 6 months. Terms and conditions of service for hospital medical staffs apply.

Applications, giving details of age, qualifications, posts held, with dates, and 3 names for reference, should be sent to the Secretary to the Board, The General Infirmary, Leeds, 1, by not later than 23rd January, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. RESIDENT ORTHOPÆDIC OFFICER required, of Senior House Officer status. The post will be initially for 6 months and will be renewable for a further period of 6 months thereafter. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference, to be sent to the Secretary to the Board by not later than 23rd January, 1958.

LEEDS. UNITED LEEDS HOSPITALS/LEEDS REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR vacancies.

Anæsthetics

Duties initially at Thoracic Surgical Units of the General Infirmary at Leeds and at Pinderfields General Hospital, Wakefield. The person appointed will be expected, if required, to interchange duties with the Senior Registrar in the Department of Anæsthetics at the General Infirmary.

Obstetrics and Gynæcology

Appointment will be made jointly to the Teaching and to Regional Hospitals. Initially the appointment will be to the Leeds A Group, but subject to satisfactory progress, a year's training will be given at the Teaching Hospital, probably in the third or fourth year.

Applications, stating age, qualifications and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 22nd January, 1958.

LEICESTER ROYAL INFIRMARY. Applications are invited for the post (resident or non-resident) of SENIOR HOUSE OFFICER to the Ophthalmic Department now vacant.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, to the Group Secretary, Leicester No. 1 Hospital Management Committee, Leicester Royal Infirmary, immediately.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of REGISTRAR in Surgery (for duty initially at the Royal Liverpool Children's Hospital) for the period to 30th September, 1958. The person appointed will be eligible to apply for appointment for the year beginning 1st October, 1958.

Apply by 25th January on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in Pædiatrics for duty principally in the Cardiological Department for the period to 30th September, 1958.

Apply as soon as possible on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL. (250 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at the above Hospital and associated units for a 1- or 2-year appointment. Post recognised for D.A. and F.F.A.R.C.S., and vacant 1st January, 1958. The Hospital may be visited by direct appointment.

Application forms obtainable from Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

LYMINGTON HOSPITAL, Lymington, Hampshire. (95 Beds.) RESIDENT SENIOR HOUSE OFFICER (medical) required 1st February, 1958.

Applications, with copies of testimonials, should be forwarded as soon as possible to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

MACCLESFIELD HOSPITAL (West Park Branch). (204 Beds.) Applications invited resident pre-registration post OBSTETRICS/GYNÆCOLOGY HOUSE OFFICER, vacant 1st February, 1958. Recognised D.Obst.R.C.O.G., training. 23 obstetric, 30 gynæcological beds. Also resident pre-registration post GENERAL MEDICINE. Vacant 1st February, 1958. Department has 62 acute beds. Excellent opportunities for gaining valuable experience.

Apply immediately for both posts, with full particulars and names of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, "Willerby House", Cumberland-street, Macclesfield.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited for post of HOUSE SURGEON. Pre-registration post.

Applications, stating age, qualifications and nationality, with names of 3 referees, to Secretary.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maidenhead. RESIDENT SURGICAL REGISTRAR. The appointment is recognised for the final examination for the Fellowship of the Royal College of Surgeons, and the successful candidate will gain excellent experience in general surgery. There are 4 other Residents, including a House Surgeon and a Casualty Officer.

Application forms may be obtained from the Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, and should be completed and returned by 25th January.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Post vacant mid-January, 1958. Salary at the rate of £467 10s.–£577 10s. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board and lodging. Post vacant February, 1958.

Applications to the Administrative Officer at the Hospital.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the Ophthalmic Department of the above Hospital. The Hospital is recognised by the Examining Board for the F.R.C.S. and the D.O. Salary £819 10s. a year less £150 a year for residential emoluments.

Applications should be forwarded to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Church-street, Maidstone.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant end of January, 1958. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £819 10s. a year, less £150 a year for residential emoluments.

Applications to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MANCHESTER, 20. GROUP PATHOLOGY LABORA-TORY, WITHINGTON HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer grade). Vacant now. Tenable for 12 months. Previous experience in pathology not essential, the post affording opportunities for gaining experience in all branches of clinical pathology. Laboratory recognised for the Dip. Path.

Applications, stating age, qualifications, present post, experience and the names of 2 referees, to be forwarded to the Group Secretary immediately.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration appointment of HOUSE SURGEON for a period of 6 months, falling vacant on 20th January, 1958. The Hospital participates in the teaching of students in the Surgical and Obstetrical Departments and posts are recognised by the Royal Colleges. Whitley Council salaries and conditions.

Applications, stating age, qualifications, appointment(s) held and the names of 2 referees, should be sent to the Administrative Officer at the Hospital without delay.

MANCHESTER (near). PRESTWICH HOSPITAL. SENIOR HOUSE OFFICER required at above Hospital (psychiatric). Single quarters available. All modern treatments practised and study facilities granted.

Applications, giving full personal details and the names and addresses of 2 referees, should be sent to the Medical Superintendent, Prestwich Hospital, P.O. Box No. 1, Prestwich, Manchester, not later than Saturday, 18th January, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the following posts :—

RESIDENT SURGICAL OFFICER (Registrar grade).
SENIOR HOUSE OFFICER.
HOUSE OFFICER (pre-registration surgical post).

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.
Manchester Royal Eye Hospital.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (medical) to commence on 19th March, 1958. Whole-time resident post for 6 months, renewable for a second and possibly a third 6 months. The successful applicant will be attached to the Rheumatism Research Centre and will have regular urgency medical duties as deputy Resident Medical Officer.

Application form obtainable from the Secretary, to be returned not later than 25th January, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. Black-BURN ROYAL INFIRMARY. REGISTRAR (medicine) required 3rd February, 1958. Resident post. Duties at Royal Infirmary, Blackburn (262 acute beds) as arranged by Consultant Physician.

Application forms from Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the resident post of REGISTRAR for the Chest Unit at Monsall Hospital, Manchester. The Unit comprises 96 tuberculous and 48 non-tuberculous beds and offers excellent experience in thoracic medicine and surgery. The appointment also includes duties at the outpatient clinic held at the Northern Hospital, Manchester.

Applications, stating age, present post, experience and names of 2 referees, to be forwarded immediately to the Secretary, Monsall Hospital, Newton Heath, Manchester, 10.

MANCHESTER REGIONAL HOSPITAL BOARD. BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT REGISTRAR (obstetrics/gynæcology) required 1st February, 1958. Post recognised for Membership and D.Obst.R.C.O.G. (combined obstetrics and gynæcology). Based on Queen's Park Hospital, Blackburn, a large busy hospital with 58 obstetric and 29 gynæcology beds. Duties also at Royal Infirmary, Blackburn, and Victoria Hospital, Accrington. Accommodation may be available for a married man.

Application forms available from and returnable to the Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of REGISTRAR in Radiotherapy at the Christie Hospital and Holt Radium Institute, Manchester. Candidates must hold either the Diploma in Radiotherapy or an F.R.C.S. or M.R.C.P.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, Manchester, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Thoracic Surgery to the Blackpool and Fylde Group of hospitals with main duties at the Victoria Hospital, Blackpool. The post available from 1st February is recognised for the F.R.C.S. and offers a sound experience gained with the 2 Consultant Thoracic Surgeons who are responsible for the thoracic surgery in the northern part of the Manchester Region. Non-resident post but residential accommodation is available if required for single applicants.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Group Secretary, Victoria Hospital, Blackpool.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE, BAGULEY HOSPITAL (402 Beds.) The Board invite applications for the post of REGISTRAR in Chest Diseases. This Hospital is a large thoracic unit fully equipped for the medical and surgical treatment of tuberculosis and other chest diseases. Attached to the Hospital is a Chest Clinic. The post offers opportunities for wide experience in medical and surgical treatment of patients suffering from tuberculosis and other diseases of the chest, together with chest clinic work. Ample scope for clinical research.

Applications, stating age, qualifications, nationality, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of appearance of this advertisement.

MEXBOROUGH. MONTAGU HOSPITAL. (168 Beds. Recognised for training for the D.A. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Married accommodation available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 20th January, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (168 Beds and 30 Beds.) RESIDENT HOUSE SURGEON.

Applications to the Secretary, Hospital Management Committee, "Fern Bank", Doncaster-road, Rotherham.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgery) for Surgical Team No. 2 (30 Beds) at the above Hospital. The post is recognised for pre-registration service under the Medical Act, 1950.

Applications, stating full details and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MURTHLY, PERTHSHIRE. THE HOSPITAL. Senior HOUSE OFFICER (psychiatry). Vacant from the end of January onwards. Term 6 or 12 months. Facilities may be afforded for postgraduate instruction in psychiatry. Good residential accommodation in the Hospital for a single person (Male or Female). Applicants may visit the Hospital by arrangement.

Applications to Group Physician-Superintendent, Murray Royal, Perth, within 14 days of publication of this advertisement.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. REGISTRAR in Obstetrics and Gynæcology required immediately, resident or non-resident, to be based at Whitehaven Hospital or Workington Infirmary as may be decided by the Committee. In the Group there are 26 gynæcology beds and 47 obstetric beds. New Maternity Department of 36 Beds opening at Workington Infirmary in January, 1958. Appointment is for 12 months in the first instance.

Applications, with names of 3 referees, should be sent to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR PSYCHIATRIST, whole-time, resident at St. Nicholas Hospital, Gosforth, Newcastle upon Tyne (1190 Beds). Married accommodation available. Good experience and training in psychiatry offered. Facilities are available for the appointee to take the Durham University D.P.M. course. Further particulars from Regional Psychiatrist.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR ORTHOPÆDIC SURGEON, whole-time, for Gateshead Group of hospitals (approximately 150 orthopædic beds). Single accommodation available. Consultant Orthopædic Surgeon also attends at Teaching Hospital.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. WALKER GATE HOSPITAL, Benfield-road, NEWCASTLE UPON TYNE, 6. Applications are invited for the pre-registration post of HOUSE PHYSICIAN in the Medical Unit of the above Hospital, which is now vacant. The work is mainly pædiatrics and acute infections, together with certain routine duties in the E.N.T. Unit.

Applications, together with the names of 2 referees, should be sent to the Hospital Secretary as soon as possible.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SURGICAL REGISTRAR at the Royal Victoria Infirmary. The appointment will be for 1 year in the first instance and subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full particulars and the name and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the resident appointment of HOUSE PHYSICIAN in the Department of Dermatology at the Royal Victoria Infirmary. This post is recognised as a pre-registration appointment. The appointment is for the period to 6th July, 1958, and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 2 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Department of Bacteriology at the Royal Victoria Infirmary. The successful applicant will assist in the general work of the laboratory, including blood-transfusion serology. Previous laboratory experience is not essential. The appointment will be for 1 year and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne, 1.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of REGISTRAR in the Department of Bacteriology at the Royal Victoria Infirmary. The successful applicant will assist in the general work of the laboratory, including blood-transfusion serology and in the research programme. The appointment will be for 1 year in the first instance and subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne, 1.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR HOUSE OFFICER (surgical) at the Royal Victoria Infirmary. The appointment will be for 1 year and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service. The salary will be at the rate of £819 10s. p.a., subject to the appropriate deductions.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne, 1.

NORTHAMPTON GENERAL HOSPITAL. (500 Beds.) Vacancy 1st February, 1958, for SENIOR HOUSE OFFICER, E.N.T. Department. Recognised for F.R.C.S. and for D.L.O. Appointment to 30th September, 1958, in first instance.

Applications as soon as possible to S. G. HILL, Superintendent.

NORTHAMPTON. ST. ANDREW'S HOSPITAL. Applications are invited for the appointment of SENIOR REGISTRAR. Previous experience in psychiatry and possession of the D.P.M. are essential. The successful candidate will work in the Hospital and at outpatient clinics. Salary £1010 rising to £1340 p.a., together with full residential emolument, or if married unfurnished house, light, coal, laundry and garden produce, valued for superannuation purposes at £200 p.a. The Hospital operates outside the National Health Service but reciprocity has been granted between the National Health Service superannuation scheme and the Hospital superannuation scheme, so that years of service are transferable in either direction.

Applications, stating age, qualifications, experience, &c., together with copies of 3 recent testimonials, to be addressed to the Medical Superindendent.

NORTHAMPTON. ST. CRISPIN HOSPITAL, Duston, NORTHAMPTON. (1100 Beds.) SENIOR HOUSE OFFICER required. Salary according to national scale (£819 10s. p.a.). Accommodation is available at the hospital. The hospital is approved for training for the D.P.M. of the Conjoint Board and the post offers excellent opportunities for participation in inpatient and outpatient work, E.E.G. investigations and child psychiatry. There is a modern admission unit and an annual admission-rate of over 850 patients annually. Regular case conferences are held.

Applications, giving full details and names of 3 referees, to be sent to the Physician-Superintendent at the hospital within 14 days.

NOTTINGHAM EYE HOSPITAL. Senior House Officer required, duties to commence about the middle of January. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration HOUSE SURGEONS required, 4th February, 5th February.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 14th January, 1958. The post is recognised for the D.A. and the F.F.A.R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration HOUSE PHYSICIAN required 21st January, 1958.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE SURGEON, vacant 15th February, 1958. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE PHYSICIAN vacant on 15th February, 1958. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer). Previous experience an advantage. Post vacant immediately.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY AND NOTTINGHAM CHILDREN'S HOSPITALS. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (orthopædics) required. Duties at Nottingham City Hospital (82 orthopædic beds) and Nottingham Children's Hospital (23 orthopædic beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 20th January, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. MAPPERLEY HOSPITAL. (1087 Beds. Recognised for D.P.M.) Whole-time REGISTRAR (psychiatry) required. Hospital quarters available. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 20th January, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery. Recognised for the final F.R.C.S. in general surgery, and recognised as a pre-registration appointment. Vacant 1st February, 1958.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 20th January, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN for General Medicine and Dermatology. This is recognised as a pre-registration appointment. Vacant 1st February, 1958.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 20th January, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON to the Gynæcological Department of 25 Beds. This appointment is recognised for the M.R.C.O.G., and may be a pre-registration appointment. Vacant 1st February, 1958.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 20th January, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for 2 posts of HOUSE PHYSICIAN to the Radiotherapy Department. These posts are recognised as pre-registration appointments. Vacant 1st February, 1958.

Applications, accompanied by 2 testimonials, should be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 20th January, 1958.

NUNEATON. GEORGE ELIOT HOSPITAL. House OFFICER in pædiatrics. Vacant now. Recognised pre-registration and D.C.H.

Applications to Hospital Secretary.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of SENIOR HOUSE OFFICER in the Anæsthetic Department at the Radcliffe Infirmary, with effect from 27th January, 1958, for a period of 6 months.

Applications, stating age, qualifications and experience, together with names of 2 referees, to Administrator, Radcliffe Infirmary, Oxford, by 23rd January.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the post of NON-RESIDENT REGISTRAR in the Nuffield Department of Surgery for 1 year in the first instance, but eligible for extension to a second year, with effect from 1st March, 1958.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 24th January, 1958.

OXFORD. WARNEFORD AND PARK HOSPITALS. SENIOR HOUSE OFFICER required (resident). Warneford Hospital, 72 Beds; Warneford Clinic (de-designated) 78 Beds; and Park Hospital for Children, 30 Beds, with Outpatient Departments, give comprehensive psychiatric experience and training facilities. Accommodation for single person.

Apply before 25th January, 1958, to the Physician-Superintendent, with names of 2 referees.

PAISLEY AND DISTRICT MATERNITY UNIT. House OFFICERS required for above Unit, term commencing 1st February, 1958.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEON required for Orthopædic Unit, term commencing 1st February, 1958.

Applications to Group Medical Superintendent.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEONS required for General Surgical Unit, term commencing 1st February, 1958.

Applications to Group Medical Superintendent.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (general surgery). Vacant 1st March, 1958.

Applications, with testimonials, should be addressed to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident, Male), post vacant 7th February, 1958. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, Devon.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st April, 1958. Recognised for the D.A., and F.F.A. R.C.S.

Applications, giving age, nationality and experience, with names of 3 referees, to be sent to the Group Secretary, 7, Nelson-gardens, Stoke, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department SENIOR HOUSE OFFICER in Casualty, vacancies 1st February, 1st April, 1958. Recognised for the F.R.C.S.

Applications, stating names of 3 referees, to be sent to the Group Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

(*a*) SENIOR HOUSE OFFICER (medical). Vacant now.

(*b*) PÆDIATRIC HOUSE PHYSICIAN. Vacant 8th February, 1958.

(*c*) HOUSE SURGEON (pre-registration). Vacant 30th January, 1958, 1st February, 1958, 9th February, 1958, 11th February, 1958.

(*d*) HOUSE PHYSICIAN (pre-registration). Vacant 31st January, 1958, 12th February, 1958.

(2) **Royal Portsmouth Hospital**

(*a*) PÆDIATRIC MEDICAL HOUSE PHYSICIAN. Vacant 1st February, 1958.

(*b*) ORTHOPÆDIC SENIOR HOUSE OFFICER. Vacant now.

(*c*) HOUSE OFFICER (orthopædic) (pre-registration). Vacant now.

(3) **Queen Alexandra Hospital**

(*a*) SENIOR HOUSE OFFICER (medical and dermatology). Vacant 29th January, 1958.

(*b*) HOUSE PHYSICIAN (pre-registration). Vacant 1st February, 1958.

(*c*) HOUSE SURGEON (pre-registration). Vacant 12th February, 1958.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

RICHMOND, SURREY. ROYAL HOSPITAL. Senior HOUSE SURGEON (resident) required 6th February, 1958, for busy general hospital of 121 Beds with full consultant staff.

Apply, giving age, qualifications, experience and names of 2 referees, to Administrative Officer, immediately.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) in the Department of Pathology of the Rochdale Group of hospitals. A new Department of Pathology is now being completed and will be opened early this year. The duties will consist mainly of clinical pathology, also general and emergency work and supervision of the blood banks. Previous pathology experience is not essential.

Applications, giving usual particulars and names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancashire, at once.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL, MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade) (1 of 2 in the department) which offers excellent experience with fractures and emergency surgery and presents facilities for study. Recognised for F.R.C.S. Post vacant now and tenable for 6 months or 1 year. Salary £819 10s. p.a.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to Hospital Secretary.

RUGBY. HOSPITAL OF ST. CROSS. (152 Beds.) CASUALTY AND ACCIDENT OFFICER (Junior Hospital Medical Officer), resident. Vacant now. Recognised F.R.C.S. Duties include orthopædic surgery.

Applications to Hospital Secretary.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. SENIOR HOUSE OFFICER (Male or Female) required from 5th February, 1958. Duties include work in general medicine and in the regional poliomyelitis unit (30 Beds) where excellent experience of modern methods can be obtained. Resident post.

Applications to the Medical Superintendent.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE PHYSICIAN (Male or Female) required from 7th February, 1958. This Hospital provides for acute medical, surgical and infectious patients. The post, which is also open to pre-registration candidates, offers good opportunities for gaining experience in both general medicine and fevers.

Applications should be addressed immediately to the Medical Superintendent, stating also names of 2 referees.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEON required from 24th January, 1958. Open to either pre-registration applicants or to fully registered practitioners.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident or non-resident) required for duties in the Casualty Department. Available for Male or Female applicants. This is a large general hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be forwarded immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROTHERHAM. MOORGATE GENERAL HOSPITAL. (342 Beds, 38 Cots.) RESIDENT HOUSE PHYSICIAN.

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

ROTHERHAM HOSPITAL AND ROSEHILL HOSPITAL ANNEXE. (161 Beds and 26 Beds.) RESIDENT HOUSE PHYSICIAN.

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

ROTHERHAM HOSPITAL AND ROSEHILL HOSPITAL ANNEXE. (161 Beds and 26 Beds.) RESIDENT HOUSE SURGEON (casualty and surgery).

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

ROTHERHAM HOSPITAL, Doncaster Gate (161 Beds), MOORGATE GENERAL HOSPITAL, ROTHERHAM (342 Beds, 38 Cots). RESIDENT HOUSE SURGEON (casualty, E.N.T. and Eye Departments).

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of Wight GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER for pre-registration service (salary £467 10s.–£577 10s., according to experience) or SENIOR HOUSE OFFICER (salary £819 10s.) required as House Surgeon. Post recognised for F.R.C.S.

Applications, with names of 2 referees, to the Hospital Secretary not later than 17th January.

SALFORD. LADYWELL HOSPITAL. (Chest Unit—110 Beds.) SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The post is tenable for a maximum period of 4 years. Previous experience in the treatment of pulmonary tuberculosis is desirable. There is a visiting Thoracic Surgeon and the surgery is undertaken at Baguley Hospital, Manchester, which is nearby. Salary in accordance with scale.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be submitted immediately to the Hospital Secretary, Ladywell Hospital, Salford, 5, Lancs.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months. Post open to pre-registration candidates.

Apply, giving names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SHEFFIELD, S. CITY GENERAL HOSPITAL. Applications are invited for the resident (pre-registration) post of HOUSE SURGEON in Orthopædics, which becomes vacant on 15th January, 1958.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to the Group Secretary, Sheffield No. 1 Hospital Management Committee, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS and SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal training scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in E.N.T. Surgery required with initial tenure of appointment at the Royal Infirmary and Children's Hospital, Sheffield. Appointment for 1 year in the first instance and renewable annually thereafter. Successful candidate will be transferred to the Royal Infirmary, Leicester, for the second phase of the appointment, in accordance with the arrangements under the reciprocal training scheme. Renewal of appointment and transfer will be subject to satisfactory work and progress.

Applications, with the names of 3 referees, to the Chief Administrative Officer, The United Sheffield Hospitals, Weststreet, Sheffield, 1, not later than 21st January, 1958.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY/ROYAL HOSPITAL UNITS. Applications invited for the non-resident post of REGISTRAR to the Department of Radiology at the above Hospitals.

Applications, stating age, qualifications, and experience, with the names of 3 referees, should be sent at once to the Chief Administrative Officer, The United Sheffield Hospitals, Weststreet, Sheffield, 1.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) Locum SURGICAL REGISTRAR required from 17th February, 1958, for 3 months.

Apply Hospital Secretary, Southlands Hospital, as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant mid-January. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Psychiatry. Applications are invited for a post as REGISTRAR in the Dundee Mental Hospitals Group (Westgreen Hospital, 660 Beds; Gowrie House, 100 Beds; and Baldovan Mental Deficiency Institution, 415 Beds). The post gives experience in acute and long-term mental disorders, mental deficiency and also in the psychiatric unit at Maryfield Hospital, a general hospital of 370 Beds. All these hospitals are associated with the University of St. Andrews for teaching purposes. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 25th January, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Surgery at Edenhall Hospital, Musselburgh.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 1st February, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

REGISTRAR in Biochemistry based at Stobhill General Hospital, Glasgow.

REGISTRAR in Pathology based at Dumfries and Galloway Royal Infirmary, Dumfries.

REGISTRAR in Plastic Surgery at the Royal and Western Infirmaries, Glasgow, for duties with the Regional Consultant in Plastic Surgery.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 25th January, 1958.

SIDCUP, KENT. QUEEN MARY'S HOSPITAL. Senior HOUSE OFFICER (casualty and orthopædic) required from 20th January, 1958. The successful applicant will serve 3 months in the Orthopædic Department and 3 months as Casualty Officer. The post is recognised under the Fellowship Regulations as one giving the required period of 6 months' casualty training.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be sent to the Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE PHYSICIAN required for post vacant 12th February. Pre-registration post offering considerable experience in general acute medical work.

Applications, with names of 2 referees, to Secretary by 22nd January.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR SURGICAL REGISTRAR required 3rd–16th February.

Application, with names of 2 referees, to Secretary.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as REGISTRAR in Orthopædic Surgery to the Canterbury and Isle of Thanet Groups of hospitals. A similar appointment to the Canterbury and South East Kent Groups has already been made and duties will rotate annually between the 2 appointments, which offer experience in traumatic work and in general orthopædic surgery, including long-stay cases. The appointments will be in accordance with the terms and conditions of hospital medical and dental staff (England and Wales).

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 25th January, 1958.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of TEMPORARY CASUALTY OFFICER (Registrar). Duties chiefly in Casualty Department, which is under the supervision of the Consultant in Orthopædic Surgery. Opportunities for work in fracture clinics in association with work of Orthopædic Department. The post is recognised for the F.R.C.S. if held for 6 months.

Applications, stating age, qualifications and experience, to be sent to the undersigned as soon as possible.

J. C. FIELD, Secretary.

SOUTHAMPTON GENERAL HOSPITAL. (469 Beds. Recognised for the membership and diploma examinations of the R.C.O.G.) RESIDENT HOUSE SURGEON (pre-registration) to the Gynæcological and Obstetric Unit required mid-February.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (469 Beds.) RESIDENT HOUSE PHYSICIAN required in February. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) Recognised for F.R.C.S. CASUALTY OFFICER (Senior House Officer grading) required.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (274 Beds) and SOUTHAMPTON GENERAL HOSPITAL (469 Beds). SENIOR HOUSE OFFICER (E.N.T.) required in February. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time GYNÆCOLOGICAL AND OBSTETRIC REGISTRAR required. Post vacant 16th February, 1958. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 28th January, 1958.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required immediately for 1 of the 2 surgical teams. Post recognised for F.R.C.S. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). The post is recognised for the D.A. and F.F.A.R.C.S. and there are facilities for study.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT INFIRMARY, Stockport. (163 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Assistant Resident Surgical Officer) (general and orthopædics) vacant 10th January, 1958. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (medicine) vacant 1st February, 1958.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKTON AND THORNABY HOSPITAL, Stockton-on-Tees. (130 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of Locum SENIOR HOUSE OFFICER (casualty) at the above Hospital for duties to commence 20th January, 1958.

Applications, with full details, should be addressed as soon as possible to the Hospital Secretary.

STOKE-ON-TRENT. BUCKNALL HOSPITAL. (84 Infectious, 40 chest beds for children, 24 pneumoconiosis, 124 chronic sick beds.) Applications are invited for post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER, vacant 1st February. Married accommodation available. The person appointed will be associated with all departments of the Hospital and will be required to assist at the pneumoconiosis clinic.

Detailed applications, with copy testimonials, to Physician-Superintendent, at the Hospital.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN required. Pre-registration post vacant January.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Recognised for F.R.C.S. 2 posts vacant January.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (general surgery) required. Recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent, as soon as possible.

SULLY HOSPITAL, Sully, Glamorganshire. Regional THORACIC CENTRE. (324 Beds.) SENIOR HOUSE OFFICER (surgical) required. Experience will be gained in investigation and treatment of chest and heart conditions.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SUNDERLAND. ROYAL INFIRMARY, Durham-road, SUNDERLAND. (300 Beds.) HOUSE OFFICER or SENIOR HOUSE OFFICER (Male) according to experience, required for duties in urological and gynæcology units. Post vacant immediately. Provisionally registered practitioners may apply.

Apply to Hospital Secretary, giving the names and addresses of 2 referees.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of GYNÆCOLOGICAL HOUSE SURGEON at St. Margaret's Hospital, vacant 18th January, 1958. To be followed by an appointment as Obstetrics House Surgeon at Swindon Maternity Hospital. Posts offer excellent experience and obstetrics appointment recognised for D.Obst.R.C.O.G.

Applications to Secretary, 7, Okus-road, Swindon, as soon as possible.

STRATFORD-ON-AVON HOSPITAL. (163 Beds.) RESIDENT HOUSE SURGEON. New post providing excellent experience.

Applications from fully registered or pre-registration applicants, with 2 recent testimonials, to Hospital Secretary.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for the post of HOUSE OFFICER (E.N.T.). Post-registration appointment, recognised for F.R.C.S. and D.L.O.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TAUNTON AND SOMERSET HOSPITAL, Taunton, Somerset. (423 Beds.) HOUSE OFFICER (general surgery) required. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, nationality and qualifications, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, Somerset.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required immediately. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality and age, together with copy testimonials (quoting reference F.955/84), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long and short stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 2 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female), graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a. less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— HENRY L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee. c/o General Hospital, Warrington, Lancs.

WARWICK (near). CENTRAL MENTAL HOSPITAL. (1400 Beds.) SENIOR HOUSE OFFICER. Neurosis unit, adult and child psychiatry clinics, departments of electro-encephalography, occupational therapy, psychology and social work. Recognised for D.P.M. Accommodation available. Post available mid-January.

Applications, with names and addresses of 3 referees, to Medical Superintendent by 18th January.

WARWICK HOSPITAL. (320 Beds.) Paediatric House PHYSICIAN, resident, required in January. 30-bedded paediatric unit. Post recognised D.C.H. and pre-registration.

Applications, with 2 recent testimonials, to Medical Superintendent.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S.(Eng.) examination. The orthopædic service is in the charge of a Consultant and Registrar closely associated with a postgraduate teaching hospital.

Applications with copies of 2 testimonials to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD HOSPITALS. NORTH WEST METRO-POLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR (resident) required for the above Hospitals. Post vacant mid-February.

Application forms obtainable from and returnable to the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by 18th January, 1958.

WATFORD. SHRODELLS HOSPITAL. (General Hospital—320 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Unit, to take up duty early in February. Modern Geriatric Unit of 180 beds. Adequate time for reading. The Hospital is within reach of London teaching classes.

Applications, together with copies of 2 testimonials, should reach the Medical Administrator as soon as possible.

WEST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics required for work throughout the West Cumberland Group but based on Whitehaven Hospital. Good experience essential, and possession of the D.A. preferred.

Apply, with full information as to qualifications and experience, and giving the names of 2 referees, to the Group Secretary at Workington Infirmary.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) of HOUSE SURGEON. Immediate vacancy.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in General Medicine to serve West Wales Hospital Management Committee. Based Pembroke County War Memorial Hospital, Haverfordwest (163 Beds). Might be expected to serve other hospitals in group. Resident/non-resident.

REGISTRAR in General Surgery, Pembroke County War Memorial Hospital, Haverfordwest. Resident or non-resident.

Subject to review annually.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. Registrar (psychiatry), Morgannwg Hospital, Bridgend (all modern treatments, active outpatient clinics, Child Guidance Clinic and Psychological Department. Within easy reach of University of Wales. Accommodation available. Subject to review annually.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. BILLINGE HOSPITAL, near WIGAN. SENIOR HOUSE OFFICER in Psychiatry. The post offers good experience under Consultant Psychiatrist. Main centre at Billinge Hospital where there is an active psychiatric unit with modern treatment and over 300 admissions annually.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. WHELLEY HOSPITAL (76 acute medical beds). HOUSE PHYSICIAN, pre-registration post, now vacant.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Anæsthetics (Registrar grade) required at the Royal Hampshire County Hospital, Winchester, with duties at Alton General Hospital, Lord Mayor Treloar Hospital and Henry Gauvain Hospital. Post recognised for the F.F.A. R.C.S., and is resident or non-resident. Vacant 1st February.

Forms of application obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester, must be completed and returned by 18th January, 1958.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (315 Beds.) HOUSE SURGEON to the Senior Surgeon. Post vacant 16th February.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (315 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 28th February.

Applications, with copies of 2 testmonials, to Group Secretary.

WINDSOR GROUP OF HOSPITALS. Plastic Surgical REGISTRAR required. Either resident (at Canadian Red Cross Memorial Hospital, Taplow) or non-resident. Successful candidate will also be expected to attend the main Plastic Centre at Mount Vernon Hospital, Northwood. Duties will include the care of all plastic surgical cases, related accident cases and hand injuries.

Application forms from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 18th January.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 18th January. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, nationality, qualifications with dates, and copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Obstetric AND GYNÆCOLOGICAL HOUSE SURGEON required, Male or Female, for post vacant 2nd February. Post recognised for M.R.C.O.G. and D.Obst.R.C.O.G. Not a pre-registration post. Successful candidate will be resident at Old Windsor Unit.

Applications, stating age, qualifications with dates, nationality, and copies of recent testimonials or names of 3 referees, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN required, Male or Female, for post vacant 11th February. Pre-registration post.

Applications, stating age, qualifications with dates, nationality, and copies of 3 recent testimonials, to Secretary, as soon as possible.

WINDSOR. KING EDWARD VII HOSPITAL. Casualty OFFICER required, Senior House Officer grade. Department forms part of Accident Service of Windsor Group. Duties include House Surgeon to E.N.T. and Eye Departments. Previous experience in treatment of acute injuries desirable.

Applications, stating age, qualifications, with dates, nationality, with copies of recent testimonials, to Secretary.

WOKING AND CHERTSEY GROUP LABORATORY. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer). The post is 1 of 2, and involves a half-share in the emergency service. Training will be available in all branches of clinical pathology. Post tenable for 1 year. Salary £819 10s. p.a. (deduction for board and lodging £150 p.a.).

Applications, stating age, qualifications, &c., together with the names of 2 referees, should be sent as soon as possible to The Director, Group Laboratory, St. Peter's Hospital, Chertsey, Surrey.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Vacancies for Pre-registration HOUSE OFFICERS (medicine) occur on 17th and 22nd January.

Please apply, with copies of 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) HOUSE OFFICER (pre-registration) E.N.T. Department, recognised for the D.L.O. and F.R.C.S. examinations. Vacant 1st March.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (pædiatrics) required. Vacant 20th January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS. Vacancies in surgery occur on 11th and 23rd January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the posts of HOUSE SURGEON (2) at the above Hospital, to commence duties on 1st February, 1958. The appointments are recognised for the diploma of F.R.C.S. (England, Edinburgh, and Ireland) and are pre-registration posts.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the posts of HOUSE SURGEON (2) at the above Hospital, to commence duties on 1st February, 1958. The appointments are recognised for the Diploma of F.R.C.S. (England and Edinburgh) and are pre-registration posts.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in Orthopædic Surgery at hospitals managed by the North West Hospital Management Committee. The terms and conditions will be in accordance with the application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 31st January, 1958.

CANADA. HOLY CROSS HOSPITAL, Calgary, Alberta, CANADA. Applications are invited for appointments as JUNIOR INTERNS (rotating) to commence 1st July, 1958. The training in this Hospital is primarily designed as preparation for general practice. Preference will be shown in the appointments for young recently registered graduates of University Schools of Medicine.

Application forms and further details may be obtained from :—
IRIAL GOGAN, M.D., Medical Director.

IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL. The Board of Management invite applications from Medical Practitioners with the necessary experience, as REGISTRAR in the Department of Surgery in the newly completed hospital.

The salary offered for the post is £1164 p.a. plus an inducement allowance for expatriate officers of £270 p.a. The appointment will be initially for 1 tour of 12 months and will be renewable by mutual agreement for a further tour of 12 months at a salary of £1212 p.a.

On satisfactory completion of the agreement, a gratuity of £37 10s. will be paid for each completed period of 3 months' service. An outfit allowance of £60 is payable on first appointment.

Partly furnished quarters are provided at a rental of 8½% of salary, excluding inducement allowance, and an expatriate doctor appointed will be eligible for 7 days' leave on full pay for each completed month of service in Nigeria. A Nigerian doctor qualifies for either 5 days' or 7 days' leave for each completed month of service.

Free first-class passages are provided for expatriate doctors and their wives on first appointment and on completion of the agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors. Free first-class passages will be provided for vacation leave.

Candidates will be eligible for children's allowances in accordance with existing regulations.

Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions, and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than the 25th January, 1958, on the appropriate forms, which will be forwarded, together with additional information, on receipt of an addressed envelope by the Adviser on Staff Recruitment, London Office (University College Hospital, Ibadan), 57, Catherine-place, Palace-street, London, S.W.1.

U.S.A. ST. ELIZABETH HOSPITAL, Covington, Kentucky. (400-Bed Hospital.) Required, INTERNES. Internship approved by the American Medical Association. Rotate through services in surgery, medicine, pediatrics, obstetrics and emergency room. Starts 1st July, 1958 and ends 30th June, 1959. Salary $200 per month with maintenance.

Contact Hospital.

U.S.A. UNIVERSITY OF MINNESOTA MEDICAL CENTER. ANESTHESIOLOGY RESIDENCIES at the above Center. 2 or 3-year programme with clinical and didactic instruction in all phases of anæsthesia. Board approval. Positions starting every month.

Address, F. H. VANBERGEN, M.D., University of Minnesota Medical Center, Minneapolis 14, Minnesota.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of REGISTRAR or SENIOR REGISTRAR in Pædiatrics at the above-named Teaching Hospital. The successful candidate will be required to commence duties on or about 1st February, 1958. The appointment is for 1 year in the first instance, and the salary will be within the scale £900–£100–£1000 : £1200–£100–£1500 p.a. depending on previous experience and qualifications. Unfurnished accommodation will be provided at a rental of 5% of salary. Return passages from and to the country of recruitment will be provided for the successful candidate only.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, B.W.I., to whom applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, should be sent not later than 18th January, 1958.

Public Appointments

BERWICK. COUNTY OF BERWICK. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH. Applicants must be duly qualified medical practitioners, and the possession of the Diploma in Public Health, or an equivalent qualification, is desirable. The duties comprise general public health work, mainly in connection with school medical inspection and child welfare. The salary is £1050–£50–£1200–£55–£1475 p.a., with placing on scale according to experience. A car allowance is granted.

Copies of duties and conditions of appointment may be had from the County Clerk, County Buildings, Duns, Berwickshire, with whom applications should be lodged not later than Wednesday, 29th January, 1958.

BOURNEMOUTH. COUNTY BOROUGH OF BOURNEMOUTH. Applications are invited from registered medical practitioners, holding a qualification in public health, for the superannuable appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. Candidates should be experienced in general public health administration and be capable of assuming full responsibility for the Health Department in the absence of the Medical Officer of Health. The salary will be within the scale of £1415–£55 (4)–£50 (1)–£1685, plus a car allowance of £110.

Further information regarding the appointment and forms of application may be obtained from the Medical Officer of Health, Public Health Department,, 17, St. Stephen's-road, Bournemouth, to whom completed applications should be returned not later than 21st January, 1958.

A. LINDSAY CLEGG, Town Clerk.

GLOUCESTERSHIRE COUNTY COUNCIL. Senior MEDICAL OFFICER, Maternal and Child Welfare. Applicants should have a wide experience of maternal and child welfare. Salary £1520–£1955, superannuable, medical examination, car driver, and should possess a motorcar.

Application forms obtainable from County Medical Officer of Health, Berkeley House, Berkeley-street, Gloucester, returnable by 1st February, 1958.

GUY H. DAVIS, Clerk of the County Council.

Shire Hall, Gloucester.

MANCHESTER. CITY OF MANCHESTER HEALTH DEPARTMENT. MEDICAL OFFICER required for duties mainly in connection with the City Council's scheme for immunisation and vaccination. Salary £1050–£1475. Medical Council "C" conditions of service.

Application forms may be obtained from the Town Clerk, Town Hall, Manchester, 2, and should be returned to him not later than 25th January, 1958.

NATIONAL DOCK LABOUR BOARD. Medical Officers. The National Dock Labour Board invites applications from medical practitioners (Male) for the following appointments:—

(*a*) REGIONAL MEDICAL OFFICERS.

(i) South West Region: based on Cardiff and covering the Bristol Channel ports.

(ii) North East Region: based on Hull and covering the Humber ports and those of the Tyne, Tees, and Wear.

(*b*) ASSISTANT MEDICAL OFFICER.

North West Region: to work under the direction of the Regional Medical Officer in charge of the Medical Services at Liverpool, Manchester, Fleetwood, Preston, and Barrow.

Candidates should have good clinical background, including general-practice experience; first-hand knowledge of industrial medicine will be an advantage.

Salary scales:—

(*a*) Regional Medical Officers—£1610–£2145 p.a.

(*b*) Assistant Medical Officer—£1400–£1665 p.a.

Commencing salary according to age and experience. Contributory pension scheme and assisted house purchase.

Fuller particulars of the duties of these posts will be supplied with application forms which are obtainable from the General Manager and Secretary, National Dock Labour Board, 22–26, Albert Embankment, London, S.E.11, to whom they should be returned by 24th January, 1958.

NAVY, ARMY AND AIR FORCE INSTITUTES. Applications are invited from general practitioners in the undernoted towns for the appointment in a part-time capacity as MEDICAL OFFICERS to this Corporation. Successful applicants would be required to examine and report on the conditions of employees of the Corporation who may be referred to them from time to time. Fees for this work will be paid on a scale agreed with the British Medical Association.

Applications, giving details of qualifications and experience, should be sent to the Chief Medical Officer, Navy, Army and Air Force Institutes, Kennington-lane, London, S.E.11, not later than 25th January, 1958.

The towns for which applications are invited are :—

BICESTER	OXFORD	HIGH WYCOMBE
WINDSOR	READING	ALDERSHOT

PONTYPRIDD URBAN DISTRICT COUNCIL. GLAMORGAN COUNTY COUNCIL. Applications for the mixed appointment of MALE MEDICAL OFFICER OF HEALTH for the Pontypridd Urban District and ASSISTANT MEDICAL OFFICER, Glamorgan County Council, are invited from Male medical practitioners who hold the qualifications prescribed by the Sanitary Officers (Outside London) Regulations 1935 and 1951 and who have been registered as medical practitioners for not less than 5 years. The salary for the mixed appointment will be £1717 10s. p.a., rising by 8 annual increments to a maximum of £2078 19s. 6d. p.a.; the point of entry to be in accordance with experience. The appointment will be subject to the Local Government Superannuation Act 1937/53 and to the passing of a medical examination.

Forms of application and particulars of appointment can be obtained from the undersigned Clerk of the Pontypridd Urban District Council, to whom they should be returned on or before Saturday, 1st February, 1958, endorsed "Medical Officer of Health."

BERNARD M. MURPHY,
Clerk of the Pontypridd U.D. Council.
RICHARD JOHN,
Clerk of the Glamorgan County Council.

Municipal Buildings, Pontypridd, Glam.

SLOUGH INDUSTRIAL HEALTH SERVICE. Applications are invited for the post of ASSISTANT MEDICAL OFFICER with effect from 1st April, 1958. Duties entail supervision of the emergency casualty service and the normal duties of an Industrial Medical Officer. Casualty experience is essential and experience in industry and/or general practice an advantage. Commencing salary £1400 p.a. with car allowance of £150 p.a. The post is superannuated. A small partly furnished cottage with garage can be rented.

Applications should be submitted at once to the Medical Director, Slough Industrial Health Service, Central Clinic, Farnham-road, Slough, Bucks, with the names of 3 referees.

SURREY COUNTY COUNCIL. Child Guidance Service. Applications are invited for the part-time post of PSYCHIATRIST to the Sutton Child Guidance Clinic for 4 sessions per week. Possession of the D.P.M. essential. Remuneration at the rate of 5 guineas per session.

Applications, stating age, qualifications and details of present and previous appointments, together with the names of 2 referees, should be sent to the County Medical Officer, County Hall, Kingston-upon-Thames, not later than 27th January, 1958.

CORK COUNTY COUNCIL. Vacancy for Junior House SURGEON, County Hospital, Mallow. Remuneration £356–£516 p.a.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than 5 P.M. on Friday, 31st January, 1958.

DUBLIN. Local Appointments Commission. Position vacant. TEMPORARY COUNTY SURGEON, Kildare County Council. Intending applicants should note that the period of employment will be at least 2 years. Salary scale: £1517 with permission to engage in private practice plus the use of certain beds.

Application forms and further particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms is now 5 P.M. on 31st January, 1958.

WESTMEATH COUNTY COUNCIL. Resident Medical OFFICER required at County Hospital, Mullingar, for a period of 6 months, subject to extension. Salary will be at the approved rate together with rations and apartments. Credit will be given for previous service in a recognised hospital.

Applications should be made immediately to the County Secretary, County Buildings, Mullingar.

GOVERNMENT OF THE FEDERATION OF RHODESIA AND NYASALAND. MINISTRY OF HEALTH. As a result of continued expansion in the Medical Services of the Federation, further vacancies exist for GOVERNMENT MEDICAL OFFICERS (Male). These are essentially general duty posts and applicants must have completed 1 year's experience since qualifying. Minimum commencing emoluments, including allowance in lieu of private practice vary between £1550 and £1750 p.a., according to experience. The maximum basic salary on this grade is £2050, but opportunities exist for transfer to centres with private practice benefits or promotion to higher grades.

Application forms and further details may be obtained from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 1st February.

WESTERN AUSTRALIA. State Public Service. Department OF PUBLIC HEALTH. DIRECTOR, Laboratory Services.

Salary: Within the range £2930(A)–£3400(A) (gross) p.a. according to qualifications and experience.

Duties: Microbiology in relation to diagnosis, general epidemiology, water and food; includes some industrial pathology and other laboratory activities. The Central Laboratory maintains a close liaison with the University's Department of Microbiology. Also connected with a Chest Hospital of 200 Beds and several country hospitals where subsidiary laboratories are being established.

Transport: A reasonable amount will be allowed for transport of appointee and dependent family to Western Australia provided appointee enters into bond to serve the State for period of at least 3 years.

Conditions of Service: Superannuation benefits, long-service leave (3 months after each period of 7 years' continuous service), liberal sick leave and other conditions applicable to permanent officers under the Public Service Act.

Further information may be obtained from the undermentioned.

Applications, closing 11th February, 1958, stating age, marital status, qualifications and experience, should be forwarded, in duplicate, to Western Australian Government Office, 115, Strand, London, W.C.2.

GOVERNMENT OF SARAWAK. Male Medical Officers required in Sarawak to undertake travelling duties in country districts. Must be prepared for arduous travelling between widely separated villages; warm welcome, however, from friendly villagers. Candidates must possess qualifications registrable in United Kingdom and must be unmarried. Appointment on contract for 3 years with gratuity (taxable) 12½% of salary (including inducement pay) for each completed period of 1 month, payable on completion of contract. Candidates from National Health Service may retain superannuation rights (up to 6 years) and receive gratuity (taxable) of 20% of aggregate salary at end of engagement. Salary scale £1218–£1988 a year, starting salary depending on qualifications and experience In addition expatriation pay varying from £252 to £336 a year. Free furnished quarters and free passages provided. Income-tax at local rates. Local leave permitted and generous home leave on completion of service.

Application forms and fuller particulars from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/34/015).

General Practice

For an **Executive Council post** *(England and Wales) apply on form* E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

GRIMSBY, Lincolnshire. Applications invited for VACANCY (chiefly urban). List at present approximately 2800. "Intermediate" area. Residence and surgery not likely to be available. Apply on E.C.16A before 17th January, 1958, to the undersigned.

K. PRIDGEON,
Clerk of the Grimsby Executive Council.

6, Dudley-street, Grimsby.

HALE, CHESHIRE. Applications are invited for vacancy in mainly urban area. Present list approximately 1580. House and surgery possibly available. Applications on Form E.C.16A to be submitted not later than 31st January, 1958, to the Clerk of the Cheshire Executive Council, 28, Nicholas-street, Chester.

Hospital Services: Non-Medical Appointments

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. GROUP PATHOLOGY DEPARTMENT. Applications are invited from suitably qualified persons for the post of NON-MEDICAL BIOCHEMIST (Basic grade) in the Group Pathology Department, Barrow-in-Furness. Whitley Council salary and conditions of service.

Applications, stating age, qualifications and experience, with names of 2 referees, to the Group Secretary, 105, Abbey-road, Barrow-in-Furness.

Miscellaneous

Nauru and/or Ocean Island—Central Pacific. Applications are invited for the position of Assistant Medical Officer. Applicants should be British born and have British University degree. Term of engagement 3½ years. Salary £1450 Australian currency p.a. Free board or allowance in lieu thereof. Free housing, partial furnishing. No income-tax. Free passage, full salary on voyage. Intermediate leave of 2 months at end of first 21 months, 3 months at end of contract, but 6 months home leave if re-engaged. Climate healthy, living conditions good. Fully equipped hospital.

Applications in writing, giving full particulars of qualifications and copies of testimonials, to the London Manager, The British Phosphate Commissioners, 2, Grosvenor-gardens, London, S.W.1.

Medical Officer required to attend non-European male employees of the Union Corporation Group of Companies in South Africa. Starting salary depending on previous experience will be up to £1500 including cost-of-living allowance. In addition there will be transport allowance of £20 per month and married and single accommodation available in Company quarters at modest cost. Pension fund and other benefits.—Applications, giving full particulars of qualifications and experience, should be addressed to Union Corporation Ltd., 95, Gresham-street, London, E.C.2.

Vacancy exists for Specialist in Physical Medicine to join Specialist in Physical Medicine in South Africa, either as assistant with view to partnership (or immediate trial partnership, depending on seniority). Must have the D.Phys.Med., must be registered as medical practitioner for at least 6 years, and must be registrable by South Africa Medical Council as specialist. Very well established practice with limitless prospects still. Cost of living and income-tax low. (Dr. James Cyriax can give information about this practice.)—Apply DR. NORMAN KLASS, 65, Pasteur Chambers, Jeppe-street, Johannesburg.

The Leicester Royal Infirmary Reunion Dinner. There is to be a Reunion Dinner for Old Residents of the Leicester Royal Infirmary, at the Grand Hotel, Leicester, on Friday, 2nd May, 1958. Any Old Resident, whose address is known, will receive notice of this dinner early in the New Year. Will Old Residents who do not receive this notice, and who wish to attend, please communicate with the Dinner Secretary, Leicester Royal Infirmary.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC 0141), who are specialists.

"Pregnancy Diagnosis by the Xenopus Method", 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON AND VINEY, LTD., Leigh Road, Slough and Aylesbury—Saturday, January 11, 1958.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

The original Lente Insulins

NOVO

Novo Lente Insulin

Novo Semilente Insulin

Novo Ultralente Insulin

All available in 40 and 80 units per ml.

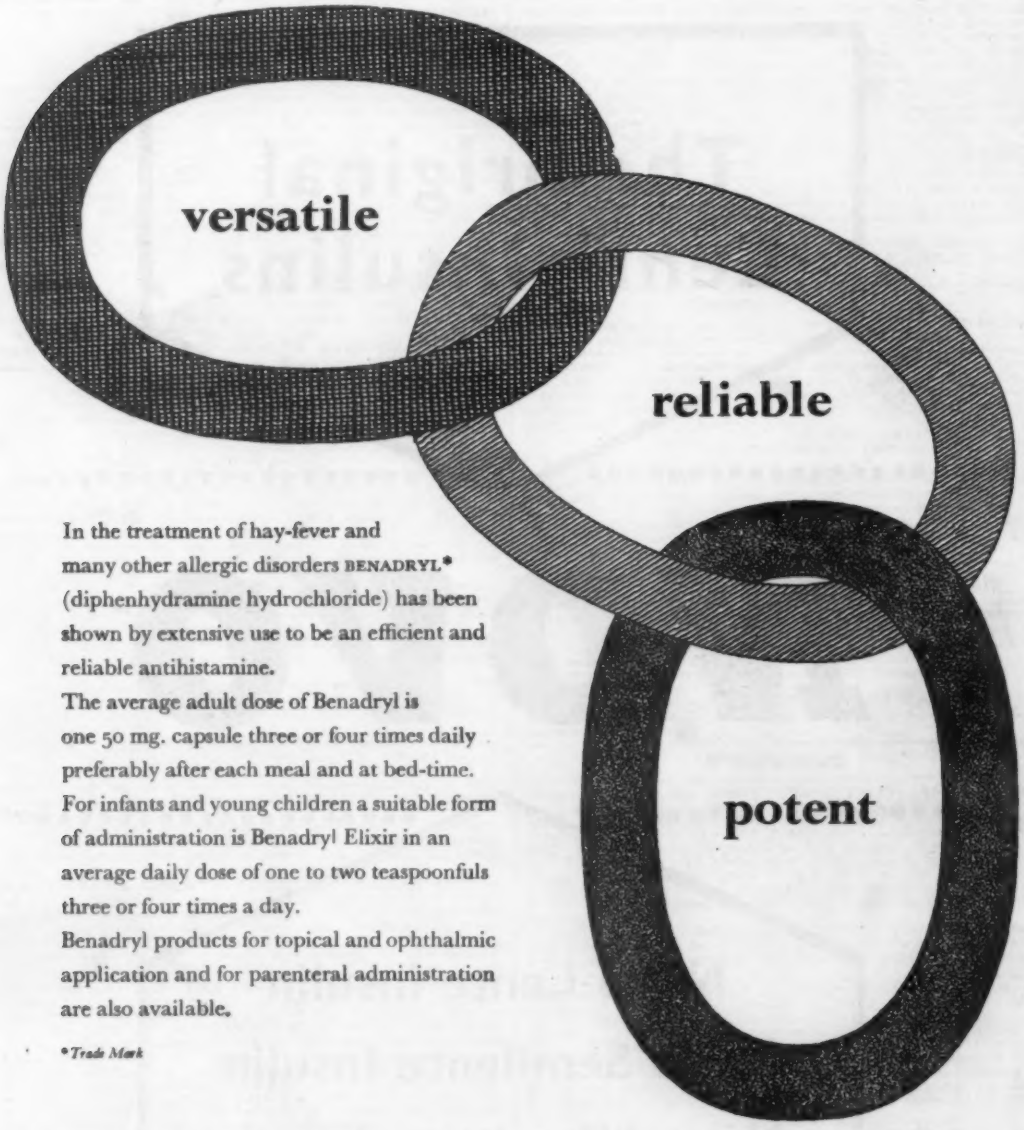
EVANS MEDICAL

EVANS MEDICAL SUPPLIES LTD.

SPEKE, LIVERPOOL 19 (HUNTS CROSS 1881)

London Office: Ruislip, Middlesex (Ruislip 3333)

134



In the treatment of hay-fever and many other allergic disorders BENADRYL* (diphenhydramine hydrochloride) has been shown by extensive use to be an efficient and reliable antihistamine.

The average adult dose of Benadryl is one 50 mg. capsule three or four times daily preferably after each meal and at bed-time. For infants and young children a suitable form of administration is Benadryl Elixir in an average daily dose of one to two teaspoonfuls three or four times a day.

Benadryl products for topical and ophthalmic application and for parenteral administration are also available.

*Trade Mark

BENADRYL *in the relief of allergy*

BENADRYL CAPSULES (50 mg. and 25 mg.) bottles of 50 and 500.
BENADRYL ELIXIR: each 4 ml. (one teaspoonful) contains 10 mg. of Benadryl. Bottles of 4, 16 and 80 fl. ozs.

Benadryl Ophthalmic · Benylin Expectorant · Benadryl Cream
Benadryl Emplets · Caladryl Cream · Caladryl Lotion
Bene-Fedrin Nasal Decongestant

PARKE, DAVIS & COMPANY, LTD. *(inc. U.S.A.)* HOUNSLOW · MIDDLESEX · Tel. Hounslow 2361
800